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A JOURNEY IN AÏR

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AÏR, apart from the fact that it is a comparatively unknown country, especially in England, is of particular interest to the traveller for two reasons. In the first place, it is a volcanic area of considerable extent in the Central Sahara, inhabited by an exceedingly interesting people, the Tuareg, or People of the Veil; and in the second it occupies a prominent position on one of the oldest trade and culture roads in the world.

While the prevalence of deep-cut watercourses and dry river-beds of some importance in the deserts of Northern Africa would suffice, apart from other indications, to show that this enormous area of land was very much more habitable in the early Quaternary period, it is fairly certain that as a whole it must have presented very much the same barren appearance ever since the earliest classical times of which we have knowledge. It may therefore safely be assumed that most of the early trade routes across the northern part of the continent were identical in the earliest historical and perhaps prehistoric days with those which survive to-day. In the east, the Nile valley has always been the most important link in the contact of the Mediterranean with the lands of Central Africa. The adjacent "road of the forty days" from Upper Egypt to Darfur dates from the Pharaohs at least, but is really a branch of the Nile valley route. The next road to the west runs from Cyrenaica by Kufra to Wadai, with branches to the Fezzan and Tibesti, but it was only made possible for caravan traffic by the Senussiya in historical times. It is now being explored by Hassanein Bey for the first time.

The three Central Saharan trade roads—(*a*) Tripoli–Eastern Fezzan–Kawar depression, to Lake Chad; (*b*) Tripoli-and-Tunis–Western Fezzan–Aïr, to the cities of what is now called Nigeria; (*c*) Algeria–Tuat–Timbuktu, to the Niger—are, however, in all probability as old as any channels for the exchange of goods and the propagation of culture from the Mediterranean to less advanced people as can be found radiating in any direction from that basin. While the last of these three is probably the most important as a culture channel, the Tripoli–Nigeria road was

the most accessible and perhaps the most frequented. To trace the actual tracks through Aïr of the people using the road was one of the tasks I had set myself to accomplish when I originally started with the intention of accompanying Angus Buchanan, who had previously visited the country in 1919–1920, from Nigeria to the Mediterranean coast, a journey which I am glad to say he is now completing with success, in spite of the many disappointments with which both he and I were faced. Chief among these was my inability to accomplish the whole journey owing to the necessity of returning home to resume my duties in H.M. Service after spending several months in Aïr waiting for the permission of the French authorities to proceed, which arrived too late to be of use to me. I am indebted to Angus Buchanan for permission to use a number of his photographs, which, with a kinematograph record of the whole expedition executed by T. A. Glover, may, I hope, soon be accessible to the public in the United Kingdom.

The history of Aïr is important to the student of North African penetration. While nearly the first actual reference to the country by name, as Kaher, occurs in Ibn Batuta of the fourteenth century A.D., there is some evidence to suppose that it may have been known to the Romans and to the early geographers. Duveyrier ('Les Touareg du Nord,' Paris, 1865) identified it with the Roman Agisymba Regio. Though I am not wholly satisfied about this, I am quite prepared to believe that Aïr was visited by at least one exploration expedition of the Romans from the Fezzan, which we know this indefatigable race of travellers at one moment occupied and probably administered. In addition to Ibn Batuta's reference, we have mention of Aïr in Leo Africanus and to the Tuareg generally in several other Arabic authors.

In the modern period the people and country are referred to in Hornemann's Journal, published in 1802, of his journey to the Fezzan, and in the comments on this publication by Major Rennell, a point of particular interest to myself, as this illustrious geographer was an ancestor of mine.* The first Europeans recorded as actually having visited Aïr are Barth, Richardson, and Overweg in 1850, while the first and still the best account both of the country and of its people is to be found in that monumental classic of African exploration, Barth's 'Travels and Discoveries in Central Africa' (London, 1857). The next European to come to Aïr was von Bary in 1877; the ill-fated expedition of Colonel Flatters, massacred in 1881 by the Tuareg of Ahaggar at Bir Garama, had been designed to visit the country, a privilege first accorded to Frenchmen when the Foureau-Lamy Mission in 1899–1900 passed this way to effect the famous junction of the three French expeditions from West, North, and Central Africa at Lake Chad. Since this date, a number of French officers have explored Aïr,† and in 1910 the Cortier Mission collated all

* See among other editions that of 1803 by Dentu, Paris.

† See especially 'Les Touareg du Sud-Est,' by Jean. Paris: Larose. 1909.

the results of previous works, producing the first reasonably complete map * of the plateau. I think I am right in saying that Buchanan in 1919 † was the first Englishman to see Aïr since Richardson in 1850.

Aïr is essentially a Saharan area which is not, as most people imagine by this term, a vast uniform waste of sand. On the contrary, the Sahara consists of very varied regions ranging from moving sand-dunes to high mountains with perennial water. Such an area as the latter is Aïr, a mountainous plateau of a general elevation of 2500 feet above the sea, extending more than 200 miles from north to south by about 150 miles from west to east. Out of the plateau rise a number of massifs in certain cases with peaks well over 6000 feet above sea-level, or over 3000 feet above the level of the surrounding country. The principal groups recognized by the natives, which coincide with European definitions, are Taruaji in the south, Todra and Bagezan in the centre, and Tamgak in the north, in addition to smaller groups scattered over the country, such as Bila, Arwa, Gundai, Agalak, T'imia, Agellal, and the northern system. The mountains, possibly with the exception of those in the extreme north, which I did not visit and of which I am therefore not competent to speak, do not appear to run in chains or even in connected groups. They are separate masses of volcanic rock, perhaps of independent origin. The general hydrographic system of the country is defined by a series of valleys crossing from the eastern edge of the plateau to the west, but not parallel to each other nor yet, with one exception, partaking of the nature of rifts or regular folds. The principal valleys are: the River of Agades, draining all the south of the country, including the southern slopes of the central massifs; the Anu Maqaran Valley, draining the northern slopes of Todra and Bagezan; the Agoras (meaning "*the* Valley") Zilalet bed traversing the centre of the plateau from the north-east corner; and the Ighazar (meaning "the Torrent"), draining the most northern part of Aïr which I visited. Further north there are other valleys, also flowing to the west, in a north-east to south-west formation. The valleys referred to by name fall into the Talak Plain and its southern continuation, under the western foothills of Aïr. This plain appears to constitute a collecting basin for the plateau; it is connected with that great north-south tributary, known under various names including Tafasasset and T'imersoi, which drains all the Central Sahara southward of the Ahaggar Mountains into the Niger. The hydrography of this great tributary of the Niger is hardly known, but would merit closer exploration.

The Cortier map of Aïr shows a number of valleys of no great length flowing from the eastern slopes of the mountains out into the desert, as well as other beds of greater length in the south-east corner of the plateau, losing themselves in the sand in a southerly direction. In regard to the

* Service Géographique des Colonies, 1/500,000 "Carte de l'Aïr," in two sheets.

† 'Out of the World North of Nigeria.' A. Buchanan. J. Murray, London.

latter, I am satisfied by my evidence that they find their way into one of the east-west valleys south of Aïr ; while the former also turn either south or north after leaving the mountains and enter one or other of the westward-flowing drainage channels on the outskirts of the area. I am inclined to regard the whole of Aïr in the Niger basin as it exists to-day, and not forming part of the watershed between it and the Chad system.

Reports have been received of valleys to the south of Ghat flowing south-east towards the Kawar depression. Should this prove to be the case, and should this chain of depressions eventually prove to belong to the Chad system, the watershed between it and the Niger of to-day would have to be looked for to the north of Aïr and in the great desert between these mountains and Kawar. In a subsequent paper reference will be made to one of the valleys south of Aïr which is reported to run all the way across the desert to a point near Fashi, which would appear to prove that all this area is in the Niger basin as well.

The boundaries of Aïr are well determined. To the east is the great waterless desert commencing sharply where the mountains disappear under the sand. On the other side the Talak plain eventually merges into the deserts of the west, not quite so barren as those on the east and of a different character, but essentially plain lands. To the north the mountains are again lost in the flat desert which divides Aïr from the Fezzan. To the south there is a belt some hundred miles in depth of sub-desert or desert steppe, the boundary which divides the Sahara from the Sudan.

We left Kano in Northern Nigeria in April 1922, reaching Katsina in seven days, and the frontier of the " Territoires du Niger," a part of the Administration of French West Africa, some three days later. From here we marched by Tessawa to Tanut, the administrative centre of Damergu, after an excursion to Zinder to see the chief administrator of the Territories. From the frontier to Aïr is a matter of twenty-four days' marching through very varied country.

At Tanut I parted from my companions to accompany a camel corps patrol to the wells of Termit situated on the road from Zinder to the Kawar depression, passing through the plains of Elakkos and over a barren area of scrub desert by way of the wells of Tars and Teshkar. I eventually found my way back alone to Damergu with four camels and two men, rejoining Buchanan in the foothills of Aïr after an excursion of 500 miles.

Between Kano and the south of Aïr we followed much the same road as Barth in 1850–1, but in the opposite direction. After leaving the park country of Nigeria, a belt of scrub bush is crossed, followed by the golden rolling plains of Damergu, broken here and there by outcrops of ferruginous rock in low hills. The country has been much deserted since the days when it was known as the " Granary of Aïr," subject to the Tuareg of the mountains, whose sultans ruled in Gamram, Jajiduna,

TEZORIGI VALLEY, SOUTHERN AÏR

BAGEZAN MASSIF NEAR TOWAR

TIZRAET POOL, SOUTHERN AÏR

MOUNT TODRA, CENTRAL AÏR

THE VALLEY OF AUDERAS, CENTRAL AÏR

MOUNT ABATTUL, NEAR AUDERAS

Tademari, and Demmili, towns now either totally abandoned or reduced to small villages. Gamram, with a few hundred Kanuri inhabitants, boasts the ruins of a mud wall to vouch for its ancient importance; the present beauty of its grove of immense acacias I can attest, and confirm Barth's enthusiastic description of this locality, the most northern permanently inhabited point of the Sudan. On the northern side of Damergu is a second belt of scrub bush gradually petering out to grass and desert vegetation which provides excellent strong camel pasture for a tribe of nomadic Tuareg. This area, known as Azawagh, is a pestilential country where the north-east wind always blows either very hot or very cold, and where the deep stone-lined wells are few and far between, if they have not entirely been filled in by the driving sand. Going north I experienced day shade temperatures of over 110°; while, returning, in one day the variation was as between over 90° at midday and 31° F. at night, with a howling icy wind which all the clothes I possessed were powerless to keep out or the sun to mitigate even at noon, except in the shelter of a bush or sand-hill.

A series of parallel broad but shallow valleys, the product, I imagine, of longitudinal dune formations, have formed along the line of the prevailing east-north-east wind. The two sides of one of these valleys, known as Tagedufat, where the first rocks of southern Aïr appear, are covered with small crescentic sand-dunes and sparse vegetation.

The true geographical boundary of Aïr is, however, still further north in the form of an immense east-west valley known under various names, to which I propose to apply one used by the natives of a portion of it where the city of that name stands on the north bank—the River of Agades.

The southern shore of this valley—and I say "shore" advisedly—is formed by a cliff in places nearly 300 feet high, so sheer along the greater part of its length as to remind one of a wave-beaten coast. To my knowledge this cliff extends from 20 miles east of the Akaraq Valley for a distance of over 100 miles towards the west. At one point a low massif of sedimentary rock, the mountains of T'in wana and Eghalgauen forms a salient in the line of the cliff, but the hills fall steeply away on their northern side, so that the shore of the valley remains unbroken except where a few small tributaries enter from the south, as gulfs or inlets in the line of the cliff, which render the illusion of maritime action even more remarkable. Such an inlet is that of the Akaraq valley, the sides of which, where the junction with the main valley, here known as Tezorigi, occurs, are also bordered with cliffs decreasing in height as the level of the plateau to the south is reached. An "island" occurs off the mouth of the Akaraq "Gulf" to complete the picture. I may mention that I found some fossilized trees in this locality.

T'in Wana and Eghalgauen are two of a number of watering-points in this massif. The former is in a ravine where the rain torrents have excavated a chasm with the overhanging and even arched sides covered

with T'ifinagh inscriptions, the peculiar writing of the Tuareg, the use of which is now almost extinct in Aïr. A magnificent pool exists here after the first rains, where we used to bathe twice a day; it was deep enough to dive into and long enough to swim in comfortably! Eghalgauen, a very large and important watering-point on the great caravan road, consists of a small pool in a sandy valley with water in considerable quantities just below the surface of the sand.

The River of Agades is the most important drainage channel of southern Aïr. Little water enters it from the south, but all the southern and central massifs of the country drain into this basin from the north. The prevalence of sedimentary rock south of the River of Agades, including the actual cliff side, with the absence of any rocks which are not clearly volcanic to the north of it, has led me to suggest that this depression is the point where the activities which formed the mountains of Aïr broke through a crust, giving rise to a fault now represented by the eroded cliff. I find it hard to believe that the cliff is due to maritime action—I saw no traces of shells or beaches; but the volume of water from southern Aïr, more especially in the past when the rainfall appears to have been considerably greater, sweeping along the face of the fault, would suffice to account for the erosion and give it the appearance of a cliff on the seashore. The best instance of the difference of geological construction to which I have alluded is at the point where the sedimentary Eghalgauen massif is only separated by a few miles from the Taruaji massif to the north, which is apparently wholly granitic.

The plain now forming the bed of the River of Agades is alluvial and in the rainy season almost everywhere impassable for camels, which get bogged up to their bellies in soft mud that a superficial layer of sand and gravel with very sparse vegetation is powerless to solidify. The valley ends in a marsh or sump beyond which little of the water from south Aïr now flows, though it is connected by a depression to the north-west with the Central Saharan tributary of the Niger. Some 25 miles west-north-west of the Eghalgauen massif is the city of Agades, one of the great desert cities of Africa.

The Tuareg are commonly believed to be a part of the Berber race, the pre-Arab inhabitants of North Africa, concerning whose origin a certain amount of controversy reigns, which I cannot discuss here. Whether the Tuareg are pure Berbers or in part a Himyaritic stock, is also a point which I cannot go into; suffice it to accept them for the purpose of the argument as a people inhabiting North Africa before the Arab invasions in the first century of the Hegira and speaking a Berber language known to themselves as Tamajegh (thus pronounced in the Aïr dialect) and written in a peculiar script, which bears no resemblance to Arabic, called T'ifinagh. There is one peculiarity to which it is as well to allude: in transliterating Tamajegh names, T before *i*, which with few exceptions acquires a liquid sound varying between

tch and the *t* in "tune," will be written as T'. The Tuareg, for the most part a nomadic people, are remarkable for the universal practice among the men of veiling their faces with a dark blue or white strip of thin cloth called a tagilmus, some 8 inches wide by 6 feet in length. This veil is wrapped round the head to form a hood over the eyes and a covering over the mouth and nose, which leaves only a narrow slit exposed for the wearer to see the world through. The Tuareg women are never veiled; while some of them may draw a portion of their dress over their faces in the presence of strangers, this is not a normal practice. The men, on the other hand, never unveil themselves; to do so would be almost equivalent to committing an act of indecency.

The Tuareg in North Africa are divided into various groups, including those in the Ahaggar Mountains (South Algeria), the Azjer division in the Fezzan, the people of Aïr, and the people of the mountains and the desert east of Timbuktu. But they have no name for the totality of their people other than Kel Tagilmus, the People of the Veil. Within each division the Tuareg fall into very distinct categories of noble tribes, called Imajeghan, and servile tribes called Imghad, in addition, of course, to the slaves which they still possess, though the practice is forbidden; that is to say, there is no traffic in human beings, but master and slave continue to regard each other by mutual consent in the light of their original relationships.

Tradition among the Tuareg of Aïr points to the first tribes having reached these mountains from Aujila, an oasis in southern Cyrenaica. There is every reason to suppose that all the Tuareg of Aïr entered the country from the north. This race, like many other Berber tribes, gradually receded from the more amenable Mediterranean lands before the spread of Arab immigration and ended as they are to-day, the inhabitants of mountain fastnesses and desert areas which were too poor and too far to be worth conquering. They are a proud and warlike people who have resisted every attempt at conquest. It took the French over thirty years to occupy Ahaggar, and then it was only accomplished after many disasters and encounters which form a glorious page in the history of the French Army in the Sahara. In Aïr, from the moment when the Foureau-Lamy Mission entered the country, the French met with bitter resistance. One large body of Tuareg emigrated to the far-distant lands east of Chad into uncongenial and hostile neighbourhoods rather than submit to the white man whom they were eventually to meet there too. They fought him four times before giving in, some to return to their old homes, others to move yet further east towards Wadai and Darfur. The Azjer in southern Tripolitania have never yet been conquered by any one; they played a considerable part in the revolt against the Italians in 1914, and the successful attack on the French post of Janet near Ghat in 1915. Finally, the whole of the people of Aïr rose against the French in 1917

Like most nomads, they are thieves and raiders by choice when an opportunity presents itself; they are poor, as only people who have no possessions can be poor, but as hard and as tough as any race there is in the world. They can travel 120 miles in twenty-four hours on one camel, and suffer the extremes of heat and cold alike, clad in a thin indigo cotton robe open at the sides, worn over the usual pair of broad Moslem trousers. When grain is available they eat it: otherwise milk and cheese of camels and goats, with the seeds of the grasses of their arid mountains, constitute their diet, only varied by an occasional dish of tomatoes and onions from their gardens, when they possess any, which is rather the exception; very rarely, sweetened tea or coffee mark red-letter days in their frugal lives. They never lose their temper, and rarely get angry, and their vices are remarkably few—none, I might almost say—for they do not smoke, and drink no fermented liquor of any sort; they rarely have more than one wife, though by Moslem practice they are allowed four. A passion for snuff, and the vanity they display in their personal appearance, are their principal failings; these, with their habit of incessantly asking for presents, excusable in a nomadic people who have so little, are the worst traits in their character, and may surely be forgiven them for the honour they pay to their women, for the love they display to their children, and for the kindness they show to their animals. A Tuareg woman enjoys great freedom before her marriage, and has love affairs of a most romantic description. A man and a girl will ride long distances to meet one another, and at no time are they subjected to censure or surveillance, but after marriage the conduct of the women is generally irreproachable. Their children are admirably brought up; they have wonderful manners, respect for their elders, and unselfishness to one another to a degree which would make European parents envious. Wives may after marriage continue to own and administer their own property, usually in the form of flocks and herds, independently of their husbands. The men do not sit at home while their women work in the gardens or watch the flocks; they have to do the work, assisted by their capable wives when household duties permit. When the script of their language was more commonly used than it is now, the women taught the children to write; they were the keepers and upholders of tradition and lore, and the advisers in tribal matters, for the children belong to the mother's tribe and not to the father's.

The first of the Tuareg to enter the country were the Kel Geres division, the most prominent tribe of which was the Ittesan, to whom are attributed the oldest and most interesting masonry houses in Aïr as well as all the deep stone-lined wells which used to abound but which now, in part, have either fallen in or become silted up. Their two-roomed houses, nearly always oriented north and south and of a very characteristic type, demonstrate a certain degree of culture which has since been decreasing. The Ittesan–Kel Geres were followed by one, and more probably two,

waves of Tuareg immigration, the later one certainly represented by the Kel Owi tribal confederation, which developed pronounced commercial instincts and became the transport and camel-broking organization on the southern portion of the Tripoli–Kano road. The Kel Owi fell out with the Kel Geres and after a long period of hostilities succeeded in driving the latter southwards to their present habitat north of Sokoto, where they have lost much of their Tuareg tradition in the process of intermarriage with the population of the Sudan. They have in consequence become darker-skinned and semi-sedentary though conserving the face veil and to a great extent their language.

At the time when the Kel Geres were still in Aïr, the need seems to have been felt for a common representative of all the Tuareg of this division. A deputation was therefore sent to Stambul to ask the Khalif for a sultan, and according to the legend, the historical accuracy of which is more than doubtful, the man selected as ruler was the son of a slave-girl of the Khalif; in consequence of this it is said, the ruler of the Tuareg of Aïr to this day is still, by force of custom, chosen from the family of the first ruler, but must be the son of a slave woman, and therefore of slave caste. Whatever may be the origin of the custom, the selection of a slave-born sultan clearly indicates that his position was never more than that of a figure-head, whose interference in internal affairs would never have been tolerated by the tribal organization of the people, and who therefore merely played the part of an arbitrator in disputes, and as their agent for dealing with the Emirs of the Sudan on matters of foreign affairs and trade. It was natural, then, that he should have been established on the southern outskirts of the country at Agades, a city said to have been founded for the purpose near an earlier settlement known as T'in-Shaman, where the French fort now stands, a little north of the city. The latter stands on an unprepossessing site overlooking the alluvial valley, here represented by bare gravel ridges and shallow depressions, with few trees except on the edge of the neighbouring Telwa valley, flowing down from the foothills of the plateau 5–10 miles north to the main bed of the river of Agades, some 15 miles away.

Who the first inhabitants of Aïr were is a matter of some doubt; they may have been the "White Æthiopians" of Pliny, now perhaps represented by the "Wild Men" inhabiting the northern mountains of Aïr, of whom the Tuareg say: "They are a noble race (not negroes, *i.e.* slaves, as the people of the south), but they are not of the People of the Veil, and they speak a language which we do not understand." Whoever the first people were, they do not seem to have founded any towns. Agades was traditionally only built after the arrival of the first Tuareg and is certainly non-Tuareg in character. It is built of mud like the cities of the south, and its inhabitants are mainly Hausa and Songhay. The latter element is so persistent that the language is still spoken there to-day: Agades, and Ingal, a small town to the west, are, I think,

almost the only places where the language of this once great empire of the Niger still survives. In Barth's day Agades seems to have been much the same size as now, with about 3000 inhabitants, though it was considerably larger just before the late European war. The extent of the ruins leads one to suppose that in the days of its prosperity, as when it was conquered by the great Songhay king, Mohammed Askia, in 1515, it may have held as many as 20,000 people. There is nothing to add to Barth's account (*op. cit.*, vol. i. chap. xvii.) of it when he visited it in 1850. The square mud minaret of the mosque he sketched still stands as a landmark for miles around ; but the sultan's palace is in rather a ruinous state. The houses are slightly more dilapidated and the atmosphere more sleepy.

The exact site of Agades is rather difficult to explain. The tracks followed by the trade road from Tripoli to the Sudan pass some distance to the east. Caravans never cared to come by way of Agades, as the various paths between the city and the northernmost villages of Aïr where the trade road enters the inhabited portion of the plateau pass over extremely rough country unsuited to heavily laden camels. Again, the pilgrim road from Timbuktu to Egypt passes through Aïr, from the western settlements of Tegidda directly to the northern villages, a course which is both smoother and shorter than through Agades. Lastly, the caravans from the south and south-west for Bilma, Kawar, and the east enter the River of Agades at a point south of the city, and immediately turn north-east to obviate a detour *viâ* the city. I have as yet found no *raison d'être* for Agades where it stands ; the objections I have enumerated have certainly tended to make it a city of the Sudan rather than one of Aïr.

I proceeded north to Auderas, a group of villages under the massif of Todra, by much the same road Barth took on his excursion to Agades from T'intellust, where he had left Richardson and Overveg. Passing the gardens of Azzal, the path winds up a valley to Solom Solom and descends again to the Telwa valley near Dabaga, which I crossed during a spate, wading through water for a quarter of a mile. Here, instead of turning east, I took the riding road up the T'inien valley, past a salt deposit, climbing on to the central plateau by an incredibly rough path consisting entirely of steps and boulders. From here a broken plain stretches all the way to the central mountains of Aïr, with the low mass of Taruaji to the south-east and some broken country to the west. The view was incredibly beautiful and totally unlike what one would expect in the Sahara. The black cliff edge of South Bagezan and the rose-red dome of Todra stand out of a plain alternately black with basalt boulders and green with the newly born grass of the rainy season. In the foreground deep green valleys filled with dum palms and thorn trees and meadow-grass as beautiful as any in England bordered the white sand or the foaming torrents of the beds.

Before the revolution of 1917 and its results disrupted the social life

of Aïr the bulk of the noble tribes were to be found to the north and around the Bagezan group and in the western foothills of Aïr. The country to the south, on the other hand, and the parts round Agades were never considered to belong to the true highlands of Aïr, but were given over to the servile tribes and slaves for pasture and sporadic garden cultivation. The noble Tuareg lives with his flocks and camels, travels, trades, and fights, and though he may live in settled villages, does not till the ground. Auderas itself, the first permanent settlement between Agades and Bagezan other than those along the River of Agades, is a group of three villages with a mixed population, ruled by one of the most remarkable men in Aïr, a noble Tuareg of an ancient line, by name Ahodu. This man became one of my fastest friends whose memory I shall always hold dear. He was the first Tuareg to enter into communication with the Foureau-Lamy Mission in 1899 on its arrival in the country, and acted the part of mediator between the French and the Tuareg at Agades; he was probably responsible for saving the mission from massacre. This wise old man does not belong to Auderas, with whose mainly servile population he has nothing in common; he originally came from the Tefgun mosque at Iferuan in the north, where his father had opposed the plans to murder Barth and his companions in 1850, not so much out of love for the Christians, but because he was a close friend of the great chief of the people, Annur, the protector of the first Europeans in Aïr, and the man responsible for their eventual passage to the Sudan. Of Annur I shall speak later. Ahodu, who also speaks Arabic and Hausa, taught me all the Tamajegh I know, and gave me much information of the ways of his people and of tradition now in process of being forgotten. He is, I suspect, half an Arab, and an inveterate fighter, as a long slashing sword wound from shoulder to hip testifies. His stories of raids on the Tebu north of Bilma and of the wars in which he played a prominent part are topics which occupied many an afternoon in telling and gave me the best idea that I could have formed anywhere of the spirit of this people.

Auderas, especially famous for the magnificent grove of date palms, and the little village of Towar further east under the foot of Bagezan, are centres of garden cultivation irrigated by shallow wells in the valley beds. It is interesting that Barth here records seeing a plough yoked to two slaves being used. The plough is not known in Aïr now.

We remained in and around Auderas during the whole of the rainy season, which this year was very heavy here, though on the eastern slopes of Bagezan and the other massifs to the north considerably less rain than usual fell, the distribution being very uneven over the whole country. At one period rain fell in Auderas for thirty-nine days in succession with five exceptions, while two or three days were conspicuous by the sky remaining overcast for the whole twenty-four hours with rain of varying intensity all day; usually in this country the rain only

falls in the afternoons, for a period of six weeks to two months in July, August, and September. Rain in December, January, and February, the product of the northern rainy season, is rare in Aïr now, though there is evidence of its having been more frequent in the past.

The Auderas valley is formed by seven small streams which collect the moisture from all the western and northern slopes of Mount Todra and some of those of Mount Dogam. It finds its way to the Talak plain by a considerable valley south of the Anu Maqaran bed. The spates here, as everywhere in Aïr, rise with great suddenness and fill the broad bed of the torrent many feet deep in a matter of an hour or so.

At Auderas there are numerous ruined houses of the first or Ittesan period of Tuareg occupation, but the earliest settlement of the district, called Abattul, was some 3 miles to the north-east. It lay right under the foot of Todra near a strange white cliff, where the groups of ruined stone houses surround a small but very famous mosque built by Mohammed Abdul Kerim el Maghili, surnamed and best known in the country as El Baghdadi, who was responsible for giving the already, for the most part, Mohammedan Tuareg a Tariq, or way of salvation, probably in the late sixteenth or early seventeenth century. The village of Abattul was doubtless originally built on this site to enable the inhabitants to seek easy refuge in the inaccessible heights of Todra; it was abandoned, as the danger of war and raids diminished, in favour of the more fertile Auderas. The mosque, as well as a place of prayer of El Baghdadi on the road north of Auderas referred to both by Barth and Foureau as a halting-place of caravans, is still in use.

Todra, the mountain of Auderas, with the peak of Dogam which forms part of the same massif, is entirely separated from the Bagezan massif by a broad basin of some importance flowing south into the Telwa valley. The Cortier map, which represents the Bagezan massif as including the mountains round and to the north of Auderas, is most misleading. The valley which divides them, with its headwaters in a plain on the east side of Mount Dogam, contains a road branching from the Agades–Bagezan road and proceeding to the north of Aïr by a shorter route though a rougher one than that *viâ* Auderas.

Across this basin, under the foot of Bagezan, reached after crossing a flat plain east of Auderas covered with large round black basalt boulders and little conical peaks, lies the village of Towar, of no great importance now except that near it are the ruins of an older village of the same name and of the town of Agejir, one of the largest of the earliest Tuareg settlements, which may have numbered three hundred stone houses, approximately on the site erroneously named Afassas on Barth's map, which the early French 1/2,000,000 map follows.

In Towar lives one of the three great guides of Aïr: T'ekhmedin, the guide of the roads to Ghat. This irreconcilable Tuareg has fought the French on every occasion he could. He is now destitute and starving

SIDI: A FAMOUS TUAREG GUIDE

IFERUAN FORT AND THE TAMGAK MOUNTAINS, NORTHERN AÏR

A TUAREG HUT, T'IMIA

THE CHIEF OF T'IMIA AND ANOTHER TUAREG

RUINS OF BARTH'S, RICHARDSON'S AND OVERWEG'S CAMP OF 1850 AT T'INTELLUST, NORTHERN AÏR

AGELLAL. VILLAGE AND MOUNTAINS, NORTHERN AÏR

ASSARARA VILLAGE, NORTHERN AÏR

and in rags, but prefers this miserable state of freedom to taking service with the French Camel Corps, where an assured livelihood and the respect of the Europeans, which his knowledge commands, would never compensate him for serving the conquerors of his country.

T'ekhmedin has no assets in the world but a small garden and the rags on his back ; yet he is the only native I have ever met who gave back the money I had given him to pay for garden produce, saying that, in return for some trifling service I had rendered him, he would accept nothing nor allow any one to sell me anything in his village as long as he was alive to give me all I required. This man, not over forty years of age, has travelled over the long 400 miles from the north of Aïr to Ghat no less than eighty times, and knows every stick and stone on the three alternative routes over one of the worst deserts in Africa.

I nursed this man during a bad bout of fever and saw him unveiled. His appearance is so typical of the higher cast Tuareg that I will reproduce the entry I made in my diary at the time. " He is a handsome man in his way—tall—say, 6 feet and very slenderly built. Small hands, wrists, feet, and ankles typical of all Tuareg—almost like a woman. Slender thighs and a thin neck. No visible muscular development. Domed forehead joining the skull, which is rather high behind. He has the typical Berber indentation of the root of the nose, which is straight with rather broad nostrils. The eyes are cheerful and bright, but deep set and hooded by the prominent eyebrow bones. Short upper lip and very thin lips, not at all everted. High cheek bones which the long narrow face throws into rather excessive prominence. The chin is very firm, very fine and very pointed, with rather an indentation between the lower lip and the extremity. Small flat ears." I must add that the peculiarity of small hands and feet is one of the most noticeable features of these Tuareg, and despite much intermarriage, always survives. Their hair is dark and wavy, but not curly. Unmarried men often wear their hair in plaits at the side, famous among ethnologists as the Libyan plait, referred to by the classical authors and represented on reliefs in a tomb of the eighteenth Dynasty at Tel El Amarna. In colouring they vary from olive to dark chocolate-brown according to the degree of purity.

From Towar and Agejir villainous tracks lead up to the plateau valleys of Bagezan. A few of these are passable by camels, but on paths which would make a self-respecting mule walk warily. In the valleys of Bagezan, 4000 to 5000 feet above the sea, is a collection of small villages where everything is green all the year round, where dates ripen six weeks later than at Auderas, and where limes are grown—the only point in Aïr where they exist. This group of mountain villages is hardly known to Europeans ; the massif is entirely unmapped.

Westward of Auderas and west of the road from there to the north is the very remarkable valley of Tagharit, with a deep waterfall over which a big torrent bordered with trees and dum palms pours itself for a long

period every year into a ravine cut through an interesting columnar basalt formation, typical of this highly volcanic country. In this valley is a cave, one of the last authenticated places where the now almost extinct lion of Aīr used to live. This particular animal was killed by the people of Auderas as recently as seven years ago, because he had slain a camel. In Barth's day the lions appear to have been more numerous; he records seeing numerous footprints near here on his way to Agades. Buchanan tried in vain to secure a specimen, which appears to be of a small maneless variety.

A day's march north of Auderas the plateau drops to a lower level, the road entering the Assada valley by a rough decline known as the descent of Inzerak. The intricate basalt foothills of the conical summit of Mount Dogam—to the east, as Barth rightly remarks, and not to the west where a serious error of the Cortier map has placed it—drain into this deep channel flowing under the eastern side of Mount Bila.

I passed this way going north twice, and both times I was privileged to see an unforgettable sight—the eastern face of Bila in the rising sun: a great cliff of red and orange rock towering 2000 feet high in the dawn against the clear blue African sky, with the deep green sides of the luxuriant Assada valley bordering a white sandy bed below. We are now in the central basin of Aīr, the Anu Maqaran valley which, as you ascend it under the name of Abarakan, divides into two deep gorges, the one turning up north to T'imia, the other into Bagezan. T'imia village, in a narrow upland plain, lies in its own massif on the north-east corner of Bagezan. This village of mountaineers is very famous in Aīr for the presence of a fine date grove and for the T'imia clan, some of the most enterprising of the more commercially minded Tuareg. The T'imia valley is a steep ravine with pink granite sides down which a stream of basalt has flowed overlying grey granite boulders. The lava at one point crosses the present water channel as a small sheer cliff, a waterfall in the rainy season, with only one small passage of incredible difficulty for loaded camels by reason of its extreme steepness and narrowness.

The new village of T'imia is built of grass and mat huts, but the older village consists of stone houses. In the Sudan houses are never built of anything but mud. In Aīr the Tuareg houses, which are of particular interest as characteristic of the northern origin of Tuareg, are all built of stones set in mud cement, with flat roofs carried on palm rafters. They are of two types: the older ones, more prevalent to the east of Bagezan than elsewhere, have two rooms—the inner room with no doors except in the partition wall, and the outer room with three doors; the second or later type to be found all over Aīr has only one room, but again with three doors. These houses are all orientated north-south, and the outer doors are always in the south, east, and west walls. The two-roomed houses have the inner room on the north side, with two ogive niches, one on each side of the door in the partition wall. This practice of house-

building is probably ritualistic, but I do not yet know the origin. Though the furniture of these houses is simple in the extreme, they are remarkably high and pleasant to live in. The characteristics are so ingrained that I have seen rectangular north-south houses built of grass and mats with flat roofs, a far more difficult operation than building round huts.

Leaving T'imia by the south fork of Abarakan, a track leads up again to the central plateau east of Bagezan, an ascent equivalent to the descent of Inzerak on the west. The plateau here is perhaps a little higher —2700–3000 feet above the sea. It consists of a wide rocky plain extending from the sudden drop of the east cliff of Bagezan to the great desert of the east 40 miles further on. The plain, in parts covered with big round basalt boulders, is intersected with ravines and further south by some wider valleys which carry the waters of the eastern sides of T'imia and Bagezan. The valleys as they recede from the mountains broaden out into the Tellia, Beurqot, and other rivers which Barth so vividly described on his way to Kano, as well-covered plains with a channel of varying course through the dense vegetation. One of these, Tabello, not far from the earliest Tuareg settlements in Aïr, is now chosen as the rendezvous of the great Bilma salt caravans which leave Aïr twice a year, now under the escort of a platoon of the French Camel Corps, to fetch salt and dates for sale in the south. The ground slopes away gently towards the south, the waters finding their way, not out into the desert as the Cortier map indicates, but round into the river of Agades, or the next valley to the south, as previously mentioned.

Except in the valleys themselves, or on the cleared tracks, the going over this eastern part of Aïr is extremely rough. Boulders of rounded basalt, ranging from the size of a football to that of a Ford van and all lying close together, combined with small ravines, render progress very painful. It is over this plain that the tracks of a great caravan road run in a straight line from a point east of T'imia, called Mari, to the Eghalgauen or Tergulalauen wells in the southern desert steppe. At Mari the tracks turn north-west and lead to Iferuan in northern Aïr. Whenever I crossed this road, sometimes as a band of ten to twenty parallel camel tracks 15 inches wide, sometimes as a single path in a defile between rocks, the point I reached was in a line with other places where I had found it to run. It is the great main road through Africa from Tripoli to the Sudan, called in Aïr, from the people that most used it and guarded it, the Tarei tan Kel Owi, or the Kel Owi road, the possession of which this tribal union fought for so long and so jealously maintained. It is worn deep in places by the countless camels and men who brought the culture of the Mediterranean to the lands of Central Africa, and having found the line of least resistance through the plateau it runs over hill and valley as straight as an arrow, the channel of civilization through the Central Sahara.

In the northern part of the plain below the last contreforts of T'imia

and Bagezan is a volcanic vent of comparatively recent epoch. Von Bary records the volcano, but neither Barth nor the French map do so. In the latter case this omission is curious as it lies not far from an important thermal spring, while the conical hill of typical form known as Gheshwa is of particular interest as the latest product of volcanic action in all that part of Aïr I visited. The scoriæ on the cone are unfixed, no vegetation is to be seen either on the cone or on the lava-flow though grass and trees abound all round. The lava-flow, about 3 miles long by 12 feet deep, is identical in character with several of the recent flows of Vesuvius or on Ischia and far less disintegrated than the Lejja in Syria. The surface is as sharp and bare as when it first cooled off, but I could trace no native tradition of activity in recent times.

Water is, of course, the difficulty in travelling in Aïr, except during the rainy season. Just before I went north, a Tuareg messenger and woman lost their way and died of thirst in an area surrounded by several watering-places, not more than five hours away. The difficulty is that water-holes are not easy to locate, and a map is not much guide for the exact point where any of the various types are situated. The Tuareg differentiate between: (*a*) *deep wells* (Anu; plu. unan), made by the earliest Tuareg who came down into Aïr; these wells are from 20 to 100 feet deep and lined with stones; when they have not fallen in, they are excellent. (*b*) *Shallow* unlined wells (Tanut; *plu.* tanautan), which have to be re-dug every year. (*c*) *Scrape holes* (Ers; *plu.* eresan), where the water is only a few inches below the sand of stream-beds; this is the easiest water to obtain and the cleanest, as the scrape holes soon fill up. (*d*) *Pools* (Agilman; *plu.* agilmanen) in a ravine, as the one at T'in Wana where I bathed, or in the sandy river valleys where a cup of rock has formed; they are pretty, but the water is usually foul.

Northward of the central massifs round which we have been ranging hitherto is a broad plain of about 2000 feet elevation, draining westwards by several important channels, on the whole less boldly accidented, but with small mountain groups emerging here and there. In the far distance westwards is Tamgak, the highest group in Aïr, running outwards into the desert to Ahaggar and the Fezzan. There are several small villages in the central plains, but the vegetation, confined as usual to the actual valley beds, is less thick; the trees are smaller and the grass is more rough and burnt than in the south. There are some good pastures, but large trees are noticeably absent until the north is again reached. In this plain lies the great town of Assode, the largest town in Aïr after Agades, and a purely Tuareg one moreover. It is a matter for regret that Barth passed so close and did not visit it. It was even then already reduced to about eighty inhabited houses. Since 1917 it has been quite deserted, but the ruins disclose the size of the settlement of early Tuareg days. There must be well over a thousand houses in ruins of various periods lying in a cup of low rocky outcrop on the

edge of a valley known to the Tuareg as "*the* Valley," or Agoras. Assode is for the Tuareg a place of great importance. The eight-aisled, low-roofed mosque is the largest in Aïr, while the town itself, with a big deep well, unprovided with any gardens and therefore inhabited by traders and camel-owners only, was the abode of a chief known as the Anastafidet To return a moment to Agades where the Sultan lives. It has been explained that the Sultan, or in their own language Amenokal, of the Tuareg of Aïr is only a figure-head or nominal ruler with little power over rival groups of tribes who never admitted his authority in their own affairs. Now, in north-eastern and central Aïr the Tuareg tribes all belonged to the Kel Owi confederation which was also called the "people of the Anastafidet," or "children of Tafidet," from the name of one of the principal clans. The representative of this confederation, the Anastafidet himself, alone communicates with the Sultan on all matters connected with the Kel Owi tribes. Since their advent to Aïr comparatively late in the history of the country, where they increased in numbers and prosperity, the Kel Owi have formed and still form a most important element. Less nomadic than their brethren in the west of the plateau and the Ittesan, the first inhabitants of these mountains, whom they eventually succeeded in driving southwards towards Sokoto, the Kel Owi were the great travellers and caravan-brokers of the Tripoli–Sudan road. They carried the trade between Nigeria and the north of Aïr or even to Ghat. It was the Kel Owi who protected Barth and who, by their foreign associations, are most amenable to European influence. In Barth's day, Annur was the chief of the Kel Owi, but not Anastafidet. The latter was, as it were, the political leader, while Annur, though only head of one tribe, became the military leader of the Kel Owi and eventually, in all but name, the ruler of all the Aïr Tuareg. He wa succeeded by Belkho, head of another Kel Owi tribe from the east side of Bagezan, who was, as the Tuareg now say, the last chief of Aïr. These two men are so typical of the Tuareg that a description of them will give the best picture of the mentality of this race as a whole. Of Annur I would like to reproduce Barth's own words (*op. cit.*, vol. i. p. 361):—

"The presents which were spread out before him he received graciously, but without saying a single word. Of hospitality he showed no sign. All this was characteristic. We soon received further explanations. Some days afterwards he sent us the simple and unmistakable message, that if we wished to proceed to Sudan at our own risk, we might go in company with the caravan, and he would place no obstacle in our way; but if we wanted him to go with us and to protect us we ought to pay him a considerable sum. In stating these plain terms he made use of a very expressive simile, saying that as the leffa (snake) killed everything that she touched, so his word when it had once escaped his lips had terminated the matter in question—there was nothing more

to be said. . . . Having observed Annur's dealings to the very last and having arrived under his protection safely at Katsena, I must pronounce him a straightforward and trustworthy man, who stated his terms plainly and drily, but stuck to them with scrupulosity; and as he did not treat us, neither did he ask anything from us, nor allow his people to do so. . . . I cannot withhold from him my esteem both as a great politician in his curious little empire, and as a man remarkable for singleness of word and purpose."

Belkho, on the other hand, from the description given by my Tuareg friends, was a very different man; small, rather hunched, and of a silent disposition, his authority was unquestioned and feared from Tripoli to the Sudan. His raids were swift, well planned, and executed on a scale which betrays imagination. He had a great reputation for generosity and wealth combined with personal magnetism of such a remarkable nature that his power was believed to be derived from communing with the spirits. "We used to see him sitting near the fire at night when he was travelling or on expeditions," say the Tuareg who knew him, "crouching with his back turned to his companions, never exchanging a word, but looking into the night with firelight flickering on his small form, casting shadows in the distance where the friends he had among the spirits sat and conferred with him."

To revert, however, to my own wanderings. From Assode, where I left my camels and baggage, I went with a very famous old guide known as Sidi and two riding-camels to the north-east to look for the village of T'intellust and the area where Barth and his companions camped for several weeks. This point, of considerable importance in the story of this great expedition, is unfortunately not marked on the Cortier map. East of Assode the country becomes more and more desolate. The large village of Igululof, a point on the great south road, is in a valley of some size with a palm grove and a few gardens, but beyond this the plateau on which the small mountain mass of Gundai stands is incredibly rough and cut up. The inherent roughness of the rock-strewn plateau is further confused by the fact that the few paths have become obstructed with fallen boulders here and there since the desertion of the district in 1917. We marched all day, and in the evening reached a low pass with a magnificent view of the whole basin of north-east Aïr, an amphitheatre surrounded by distant hills on the edge of the desert, and drained by the immense bed which Barth calls T'intellust, but which has no individual name. That night we slept with our camels grazing in the deep bushes and grasses of Anu Samad at its junction with the great nameless valley. The geography of the area is not properly brought out in the Cortier map, to which I have been able to bring several modifications, but life is complicated for the European amateur geographer by the discovery I eventually made that the main valley derives its various names from the villages on its banks, which in turn are called after the

tributaries near which they stand. Thus one section of the main valley will be called T'inieres from a small right-bank tributary; the next section, that of Assarara, from a village which I passed later; the next one, T'intellust, from a small tributary and village; and a section above, the valley of Oborassan, again from a village of that name opposite the junction of a left-bank stream.

Next morning I marched till about 9 a.m. up the main valley, when Sidi stopped me and said we had reached the T'intellust section with the small village of that name a few hundred yards on the left. He asked me spontaneously, without having previously had any idea of why I had wanted to come here, whether I wished to go to the village or to the "House of the Christians." I asked him what he meant, and as we halted before the remains of some grass huts he explained how his father had told him that here were built the temporary houses of three Englishmen in the days of the Great Annur. The spontaneity of his remarks, coupled with his great wisdom in all matters connected with Aïr, have convinced me that the huts of which these ruins survive were none other than those erected for and inhabited by Barth, Richardson, and Overweg in 1850, when they, as the first Europeans to visit Aïr, passed through on their memorable journey to the Sudan from which Barth alone returned alive.

On a bank in the stream-bed lie the remains of three huts, little piles of wood and thatch, beside which little remains but a wooden drinking-trough and a circle of stones to remind the retinue of their Holy Land. But small and forlorn as these little heaps are they have never been touched or disturbed by the people of T'intellust, only a few hundred yards away on the edge of the rocky ledge which borders the valley, in all the seventy odd years since the Christians came and went. Sidi explained that the site had never been reoccupied or touched; it was too well known as the "House of the Christians" who had been the friends of Annur, and who had proved to be different from the White Men who came later as conquerors.

And so we see Barth's speculation fulfilled, for he wrote of this camp at T'intellust—he a German: "Doubtless this sandhill will ever remain memorable in the annals of the Asbenawa (the Hausa name for the people of Aïr) as the "English Hill," or the "Hill of the Christians" (*op. cit.*, vol. i. p. 334).

We may well be proud in the realization that this expedition of an Englishman and two Germans sent by Her Majesty's Government to explore Central Africa and report on the suppression of the Slave Trade, should be remembered and respected in the far country of Aïr. In Science there is no nationality and there should be no prejudice, as was realized when Barth and Overweg were chosen to accompany Richardson on this expedition. But the initiative was British, and has never received that measure of popular recognition which was its due.

From T'intellust village, where Barth must have spent many hours, I marched to Oborassan, another of Annur's villages, and then back west along the road by which they had come, past Agwau to Assarara, also villages of the same chief. Here I spent a night in most picturesque surroundings and returned to Assode, which I left next day for the Ighazar valley under the northern massif of Aïr named Tamgak. After crossing the valley on the east side which leads out into the great desert and by which raids often enter Aïr, the road climbs a steep pass and descends to the valley of Faodet, the headwaters of the Ighazar. Ighazar means, properly, the running river; it is of course dry most of the year, but perennial water survives all along its bed in large quantities, as is also the case in the T'intellust valley, with the result that, as in the latter, villages sprang up along its banks. The principal villages are Faodet, Iberkom, Tanutmolet, T'intaghoda, Seliufet, and Iferuan, the two last being almost continuous, and possessing fine gardens and date groves. The Ighazar is very important as the last permanently inhabited area in northern Aïr, and consequently as a stage on the caravan road from Tripoli to Nigeria. Here a number of Arabs from the north and several important camel-brokers used to reside, since goods in transit changed camels and were stored in the houses and khans of the villages for some time. As a general rule, the Aïr Tuareg carried the goods on the sections south of Ighazar, while northern Tuareg and Arabs served the section from here to Ghat. Of these villages, T'intaghoda was the most important, but it has been deserted since 1917. The Kel T'intaghoda were Holy men, though this did not prevent them trying hard to bring about the massacre of Barth's expedition on three occasions, when he camped near here, further north on the outskirts of the country, and again in an attempt so deprecated by Annur at T'intellust itself. The mosque of T'intaghoda, nothing much to see, is a low stone building of no size, but said to be the holiest and oldest in Aïr. At Iferuan further on is a small French post established to give moral support to the administration and to the inhabitants who are being persuaded to return from the south, but for whom the fear of raids from the east and north has proved rather a deterrent owing to their reduced numbers and lack of arms. The gardens and date groves are very fine, and used to produce irrigated wheat in certain quantities stored in huge clay amphoræ—a habit copied from Nigeria.

The country is very beautiful. The intense green and thick vegetation of the Ighazar valley and a perfect climate were claimed by my lonely French friend—the officer commanding this fort, twelve days from the nearest white man and with no wireless or communications and no camels to give his force of twenty-five Senegalese mobility—as the health resort of the colony, as the Switzerland of the Sahara! It may yet one day prove important as a landing-ground on a great trans-Saharan air route, for which the plains near the fort are admirably

suited. Air routes have a tendency, I notice, to follow old trade routes and imbue them with new life.

From here I regretfully turned south past Agellal town under a most beautiful mountain and over the western ends of the valleys of Aïr where the country drains into the plain of Talak on the edge of the western deserts. From Agellal I returned to my northern route and entered the Assada valley once more, camping under Mount Bila on my right one evening at sunset. Next day I rejoined my companions at Auderas and turned definitely away from Aïr, the last sight of which I saw in the low T'ina Wana hills at the pool of Eghalgauen overlooking the desert. In twenty-seven days, but long days averaging nine hours' marching, after leaving Iferuan with only one halt at Auderas, I arrived at Kano *en route* for the dreary routine of office work in London.

Before the paper the PRESIDENT said: This evening we return to the Continent of Africa, and we are to have a paper by the son of a distinguished father, who bids fair to tread in his father's footsteps. The journey which is to be described to us to-night took Mr. Rodd from the Foreign Office for a period, I think, of something like eleven months. He did not obtain leave, but the Foreign Office released him, whatever that may mean, for the purpose of this journey. He left the Foreign Office in order to proceed to the land of Aïr. At first sight the title appears to be a contradiction in terms, but if the word "Aïr" is correctly written, it has two dots instead of one over the "i," and is pronounced, I believe, "A-ir." It is the mountainous land, I understand, which lies upon one of the five great ancient trade routes which ran into the heart of Africa from the Mediterranean. It has been very little explored by Englishmen. The standard work upon it was written by a German, who, however, had the good taste to write his account of it in English, and though he was of German nationality, undertook the journey in the interests of the British people and Government. You can understand that in a country of this kind there must be much that is new to an English audience, and we shall listen with great interest to the account which Mr. Rodd will be able to give us of the journey which forms the subject of his paper. I now have great pleasure in calling upon him to give us his paper.

Mr. Rodd then read the paper printed above, and a discussion followed.

The PRESIDENT: The country, as I said in my opening remarks, is little known to Englishmen, and it is not very easy to find any one who can say anything about it. It marches with the British territory of Nigeria, and we are fortunate enough to have amongst us this evening the Lieutenant-Governor of Northern Nigeria, Mr. W. F. Gowers, and I would ask him if he would be kind enough to say something.

Mr. W. F. GOWERS (Lieut.-Governor of the Northern Provinces, Nigeria): When the President and the Members of the Royal Geographical Society asked me to come here to-night to hear Mr. Rodd's very interesting paper, I little thought that I should be called upon to make any contribution myself. I enjoyed listening to Mr. Rodd's paper immensely, because I have for a number of years lived within a comparatively short distance—a distance represented by, let us say, 6 feet on the map which has been used to-night—from the country which he has described. But although I have lived within fairly close touch with that country for some fifteen or twenty years, and have

met plenty of people who have lived in it, I have learned, perhaps, more about it to-night than I ever knew before. When I say that, I am not jesting, I assure you, and I did not mean to make you laugh. I never realized before, for example, what the rainfall there must be until I saw the pictures of the rivers in flood. I had always pictured the land of Aïr as a desert where it practically never rained at all. But obviously, from the pictures we have seen to-night, the rainfall must be very considerable at times.

As one who has profited for many years past by the reading of Barth's book, I should like to endorse every word that was said by Mr. Rodd about that very eminent explorer. As you all know, Barth described the country which is now known as Nigeria, especially the northern part of it, and I have never found him at fault in any detail whatsoever, whether geographical, ethnological, or linguistic. His accuracy in all those matters is perfectly marvellous. It is probably true to say that there is not a single man to-day who knows as much about the northern part of Nigeria, although we have been in it for more than twenty years, as Barth did. In regard to accuracy of observation and lucidity of description, I think you will all agree with me that Barth has a very worthy successor in Mr. Francis Rodd. He is the only Englishman who has given us any description at all—at any rate, I will say that he is the only English explorer who has related his travels in English, who has given us any adequate description whatsoever of the country about which we have heard to-night. I really do not think I can raise any point of discussion on Mr. Rodd's paper, because I agree with every word there is in it—at any rate, wherever he has described anything that has come within my personal observation or information. It only remains for me to voice the gratitude which I am sure you all feel for his most interesting paper.

The PRESIDENT: It only remains for me to echo Mr. Gowers' concluding remarks, and to express on your behalf and mine our thanks to Mr. Rodd for the paper he has read to us this evening. I am sure we must have listened with the greatest sympathy to his description of the people amongst whom he found himself during his exploration of the plateau of Aïr. A people whose spirit was such that they refused to admit defeat, and retreated time after time until they were driven into those distant corners of the Earth must always, I think, evoke the sympathy of a British audience. It was with some feelings of regret also that one drew the conclusion from Mr. Rodd's description of them and of their present position, that they were rapidly, or, at any rate, steadily losing the culture which apparently once was theirs. Let us hope that further explorers will follow in the footsteps of Mr. Rodd, and will be able in time, perhaps, to stay the period of cultural degeneration which appears to have set in amongst this picturesque but unfortunate people. I am not competent to say anything of value upon this part of the world, and I rose only to offer an expression of your gratitude to Mr. Rodd for the interesting and instructive paper which he has given us to-night.

PRELIMINARY REPORT ON THE RESULTS OF THE DANISH BICENTENARY EXPEDITION TO NORTH GREENLAND

Lauge Koch, M.Sc.

I

Introduction

IN 1906–08 the " Danmark Ekspedition " under the leadership of the late L. Mylius Erichsen explored north-east Greenland, and the surveyor of the expedition, Col. J. P. Koch, of the Royal Danish Army, was able to fill in the blank spaces with his excellent maps covering the area from 77° N. lat. to Peary's cairn on Cape Bridgman in 83° 30′ N. lat. Thus the whole east coast of Greenland had been surveyed by Danish explorers. On the west coast the Danish surveys reached beyond the 74th parallel.

The maps of the western part of north Greenland from Cape York to Humboldt Glacier were fairly good, thanks to the work of numerous British and American expeditions, but the mapping of the remaining portions of the north coast had not been extended far beyond the outer promontories. The second Thule Expedition, led by Mr. Knud Rasmussen, explored the ice-free areas as far as De Long Fiord in 83° N. lat., 40° W. long. Mr. Lauge Koch was a member of that expedition and carried out the geological and cartographical work. A preliminary report on the geological results, containing one map, was published in 1920 in *Meddelelser fra Dansk geologisk Forening*, vol. v, No. 17, under the title " Stratigraphy of North-west Greenland "; his maps are now in the press; these are:

1. Nord-Grönland fra 81°–83° 25′ Nordlig Bredde og 38° til 56° Vestlig Længde, opmaalt 1917 paa II. Thule Ekspedition af Lauge Koch. 1 : 500,000.

2. Melville-Bugt fra Wilcox Head til Cape York, opmaalt 1916 paa II. Thule-Ekspedition af Lauge Koch 1 : 500,000.

In the following pages several new names and some additional data given in the first of these maps are quoted. Most of the information will, however, be found also in the geological map on 1 : 2,500,000 appended to the paper mentioned above.

When Denmark in 1916 ceded the Virgin Islands to the United States, the government of the United States agreed not to object to the title of Denmark to the whole of Greenland. In 1921 Denmark celebrated the Bicentenary of her last colonization in Greenland, and in the same year supremacy in the whole of Greenland was conceded to Denmark by the other nations interested. Thus it seemed to have become a national duty to extend under the Danish flag the investigations and surveys to the last remaining portions of the coast, the section from De Long Fiord to Cape Bridgman, the most remote and inaccessible part of Peary Land.

Mr. Lauge Koch planned an expedition with this aim (see *Geogr. Journal*, vol. 56, p. 323). A committee consisting of Messrs. C. F. Wandel, Rear-Admiral Royal Danish Navy (retired), E. Erlandsen, shipowner, J. Daugaard-Jensen, director of the administration of Greenland, V. Glückstadt, Consul-General for Italy, and Eug. Warming, professor emeritus at the University of Copenhagen, procured the necessary funds, partly from the State, partly by private subscription, and in 1920 Mr. Koch left for Greenland and established his headquarters at Robertson Bay in Inglefield Gulf.

During the winter of 1920–21 all necessary preparations were made, and early in 1921 he started, accompanied only by Eskimo of the Cape York tribe. A Dane, Mr. J. N. Nygaard, formerly assistant at the Danish Arctic Station at Godhavn, became a member of the expedition, but travelled later and independently of Koch for the purpose of collecting fossils and plants on Washington Land and Inglefield Land. It is hoped to present a preliminary report on his botanical results shortly.

As Mr. Koch is still continuing his work on the north coast of Greenland, he has entrusted the undersigned with the preparation of his report and sketches for publication, and they are printed here with the kind permission of his Committee.

MORTEN P. PORSILD.

The Danish Arctic Station,
Disko, Greenland, July 1922.

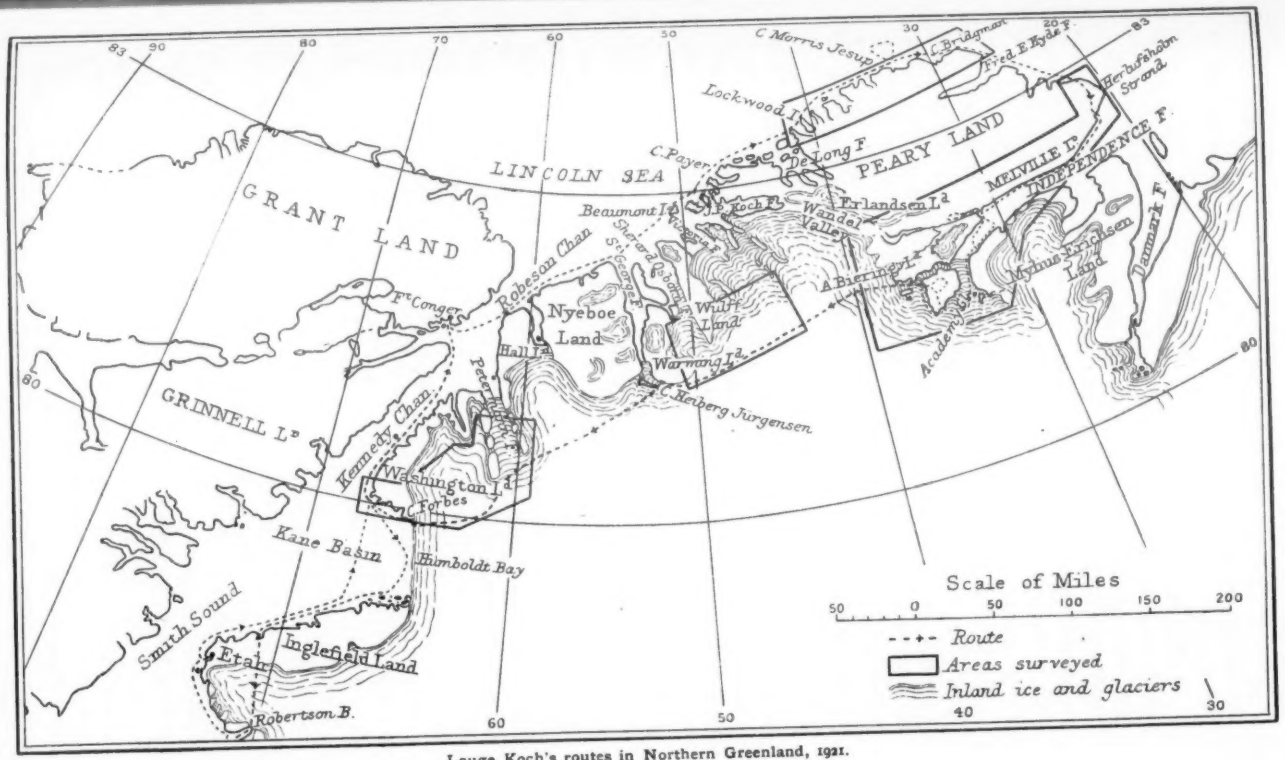
The Outfit.—We had to carry with us a very considerable supply of food, as I wished the surveying work along the north coast to Cape Bridgman to be quite independent of and undelayed by hunting. But as it was not intended that the expedition should return to its headquarters in Inglefield Gulf before late in the autumn, for the rest of the journey we had to depend exclusively upon the resources of the country, especially in the neighbourhood of Independence Fiord. Here it was our plan to stay until supplies of meat and blubber were secured sufficient to bring ourselves and our dogs safe across the ice-cap from the head of Independence Fiord to Washington Land—a distance of not less than 700 kilometres.

Our outfit was the same as that ordinarily used in this part of the world—Eskimo sledges drawn by a team of eight to ten dogs each. The provisions were pemmican for men and dogs, and oatmeal, chocolate, sardines, and coffee. For travelling along the coast we had Canadian snow-shoes, and over the ice-cap we used skis.

We carried three magazine rifles, two shot guns, and one revolver. We had two canvas tents, which could be used as sails for the sledges. With each sledge was a set of leather floats, such as are used by the Eskimo in sealing. When attached to the sledge runners these floats easily kept the sledge with its load floating, and thus made possible the crossing of open leads and streams. We had garments, foot-gear, and ammunition sufficient for two years.

The Start.—On March 18 the expedition started from the headquarters in Inglefield Gulf. At the outset the expedition consisted of 19 sledges and about 200 dogs, and besides our outfit for use on our way to Peary Land, we carried 1500 kilograms of pemmican, 1500 kilograms of walrus-meat, and 400 litres of kerosene.

The ice was excellent, and we skirted Cape Alexander to seaward instead of crossing the ice-cap. From Etah five sledges returned, and on the famous ice-foot of Inglefield Land we sledged up to the 79th parallel. Most of the time the temperature was $-40°$ C., and in the shade of the hills to the south both men and dogs suffered a good deal from a very unpleasant frozen mist. On March 27 we reached Washington Land in 80° N. lat., and five sledges returned. Unfortunately the ice was very hummocky all over Kennedy Channel, and several times our sledges were wrecked and we had to make repairs. On April 5 we camped at Fort Conger on Grant Land and found the provisions placed here the year before by Captain Godtfred Hansen for Captain Roald



Lauge Koch's routes in Northern Greenland, 1921.

Amundsen in good condition. The hunting was excellent, and we rested here for a fortnight.

Before the start the Eskimo had contracted an itch-like disease by which we gradually all became infected, especially on our legs. When we reached here it developed into very severe psoric pustules or boils, combined with feverish attacks. At the settlements the disease lasted throughout the whole summer, and several persons died from its attacks. One of the best Eskimo, who was to have followed me to Peary Land, had to return to headquarters.

On April 19 we left Fort Conger and found the entire Robeson Channel bound with new ice without hummocks, and next day, after an extraordinarily easy crossing, we landed at Frankfield Bay in 82° N. lat. From here the rest of the auxiliary sledges returned, and our party was reduced to four men, three sledges, and thirty-two dogs. All the auxiliary sledges reached their homes in safety—the last after a journey of not less than 1600 kilometres.

On the Coast of the North Polar Sea.—We now encountered heavy pack of polar ice forming hummocks of tremendous height. After a most trying journey we reached Beaumont Island, and we were encouraged by finding several tracks of musk-oxen, apparently quite fresh. Unfortunately the animals had left the island, and the prospects of a well-deserved rest and feast vanished. But shortly after this the ice conditions improved considerably. On May 1 we passed the 83rd parallel, and four days later we were off De Long Fiord, and had thus passed the northernmost point reached by Mr. Knud Rasmussen and myself in 1917. Here I divided the expedition into two parties, one of which consisting of two Eskimo, with the best teams and most of the outfit, continued its way to Cape Bridgman to hunt, and, if possible, to accumulate provisions of fresh meat. The third Eskimo accompanied me on my surveying work along the coast. On May 13 I reached Cape Bridgman, and in the evening I started out on the pack-ice north of Greenland. The ice was exceptionally even, and there were no open leads or heavy hummocks to be seen. On the morning of Whitsunday I finished my surveying work and found the latitude to be 83° 50′ N. My tiny flag waved lustily from my surveying rod beside the theodolite, marking the northmost point ever reached by the *Dannebrog*, whilst to the south the mountains of Greenland lay in a thin bluish haze.

The weather, which for a whole month had been fine, now changed to an unsettled period of snow and mist. Next day we joined the other party at Cape Bridgman.

On May 21 I was able to fly the colours of my country from the cairn built by Colonel J. P. Koch, and thus the *Dannebrog* had now flown along all the coasts of Greenland. It was a grand day to me, as I had now fulfilled the aim I set myself when eight years ago I came to Greenland for the first time. The last remaining part of the Greenland coast was surveyed.

Southward from Cape Bridgman to Brönlund Fiord.—So far we had found no tracks of musk-oxen, and from Cape Bridgman we had travelled against a heavy snowstorm which rendered any hunting impossible. The Eskimo on their way northward had secured but fifty-three hares and one wolf. Our last pemmican had been eaten; one after another the dogs collapsed, and we had to pull on the ropes ourselves to assist the remaining dogs. The snowstorm lasted for a fortnight. We were all utterly exhausted when suddenly the sun appeared, and at some distance we caught a glimpse of a herd of musk-oxen. But before we could get within range the fog came rolling in, and it was not until thirty-six hours later that we found the animals and secured all nine of them. The youngest of the Eskimo here cast aside all his stoicism, and, standing amidst the steaming carcases, half naked and smeared with blood, with two musk-ox horns as a drum he sang the ancient magic incantations of his tribe, while white and heavy flakes of snow continued to melt on his brown chest and shoulders. Half-forgotten recollections of exciting bear-hunts in fantastic moonlight and of midsummer nights spent under the huge fowling cliffs in the company of women and children he conjured up to us, and the song ended in a wild and jubilant impromptu to the very joy of life as one may experience it when the wild and furious struggle for existence in the cold arctic night is over and the land lies warm and radiant before you.

On June 1 we entered Independence Fiord. The temperature had during the last days of May been —10° C. Now the snow ceased falling and the sun came out. The melting of the snow began, the seals crept up on the fiord ice, and we experienced a period of abundance of food for men and dogs. Hitherto only a few wolves had been seen, but now they became quite numerous. A hard packed path led along the ice-foot, and soon neither we nor the dogs paid any attention to them. They were all very fat and took no interest in us. In spite of the melting snow the surface of the ice continued to be excellent. On June 9 we entered Jörgen Brönlund Fiord, and, seals being numerous, decided to stop here for some time to feed up the men and dogs. It was also necessary to accumulate meat caches for use during further explorations.

From this base I reached the head of Independence Fiord, found the cairn of Mylius Erichsen, and took with me his report.

The "Peary Channel."—In order to finish the survey of Independence Fiord I thought it desirable to climb the highest point here. Burdened with my instruments I set out accompanied by one of the Eskimo. After a long and exhausting climb we reached the foot of the mountain. Down below us lay the valley dotted with lakes, and with extraordinarily luxuriant vegetation forming verdant oases. As we continued our way up, more and more land became visible. Only the view to the west, where I expected to see the inland ice, was still hidden by the hills. At last we reached the summit and at once exclaimed,

" Taserssuak ! "—a great lake. All Peary Land was laid bare before us like an enormous map. To the north high torn mountains with numerous glaciers, the highest peaks hidden in clouds ; to the south big inviting valleys ; and to the west the big lake in an enormous cañon, surrounded by ragged hill-slopes. Far into the country the cañon turned northwards and vanished from our sight. Like a flash it struck me : This is the Peary Channel. This must be the great depression seen by Peary from the ice-cap twenty-eight years ago. One month later I stood on the ice-cap myself approximately where Peary had stood, and my supposition proved to be correct. From different locations Peary had been able to see the big frozen lake and to follow the depression in the surface of the land leading from the Polar Sea to the head of Independence Fiord. Peary thus was fully justified in believing that this depression meant a channel, and it is most admirable to see the approximate correctness with which he indicates its course.

The " Peary Channel " is a big valley from sea to sea, partly filled up by a lake, the surface of which is about 200 metres above sea-level. The valley does not, however, connect Nordenskiöld Fiord with Independence Fiord, as Peary according to the imperfect maps of his time believed, but J. P. Koch Fiord with Jörgen Brönlund Fiord, and these I have only recently mapped myself.

I gave the valley the name of Rear-Admiral C. F. Wandel, president of the committee in charge of my expedition, and the land north of it I named Erlandsen Land in honour of the zealous patron of my work, Mr. Erlandsen of Copenhagen.

Ascending the Ice-cap.—On midsummer eve we stood at the Academy Glacier and the ascent began. The condition of the glacier was far from favourable. Creeks and rivulets crossed our course, and several times we had to hoist our sledges over vertical ice-fronts or over steep hill-slopes where beautiful cascades splashed down. In crossing lakes we had to use the floats which we carried for the purpose, and with our skis and snow-shoes we paddled across.

At last we reached the more even part of the glacier, but it was about the worst time for travelling in the border-zone. The melting had commenced and large portions of the névé had changed into shallow lakes and slush. In the course of the next few days the glacial streams increased enormously, and together with systems of half-hidden fissures in the surface they rendered the travelling rather hazardous.

On the Nunatak Vildtland we hoped to find musk-oxen, but the hunters returned without results. This was a very serious misfortune, and we all understood perfectly that it meant short rations during our crossing of the ice-cap.

On July 3, the Bicentenary Day, we hoisted our flag and made ourselves as comfortable as possible. I told the Eskimo what the day meant to me, and that our king had ruled Greenland now for two hundred years.

This fact, I must confess, did not interest them so much as the frugal allowance of chocolate and sardines we had kept for the day. The next two weeks we spent in hunting hares, which were numerous, and on Adam Biering Land we secured one musk-ox.

Crossing the Ice-cap.—July 18 we left Adam Biering Land and again ascended the inland ice, which lay beautiful and radiant before us. Our nourishment consisted of raw frozen hares and coffee "sweetened" with tooth-paste.

Abreast of the Victoria Fiord we met with an abundance of fissures. From this point we had a good view of the fiord, and large unknown land areas were mapped. This done we went southwards towards the great depression behind Sherard Osborn Fiord and Warming Land, where in 1917 the second Thule expedition started on the desperate race for life across the inland ice which caused the death of Dr. Th. Wulff.

On Warming Land we expected to find a depôt placed here by the Eskimo, but, as we learned later, the disease amongst the Eskimo had rendered this impossible. We now had only ten dogs left, and of the provisions a scanty supply of musk-ox meat.

The situation was most serious. Before us there were still 300 kilometres to the cache at Cape Forbes on Washington Land. Of the surveying work I had still the land around Petermann Fiord left to do, but in spite of the precarious situation the Eskimo agreed to let me finish this work too, and I must here attest the admirable spirit which never left my comrades, and, even through the hardest and most trying days, they never grew impatient or wanted to leave me or my surveying, but were most interested to see the map grow. The Petermann Glacier is in bad repute, and both Peary and others had to skirt it at a considerable distance. Now we had no choice; we had to cross it, and with very uneasy minds we descended the first slopes towards it. Soon we were surrounded on all sides by crevasses, and one of the Eskimo quite laconically remarked, "Now for the first time I know what fissures mean." Men and dogs were tied together, but we safely reached the other side with the loss of only one dog, and the distance had decreased to 100 kilometres. We had four dogs left, which meant life for four days.

On August 11 our rescue came in the shape of a heavy gale from the north. We tied the dogs to the sledges, put up our sail, and with the speed of an automobile we rushed towards the depôt. Down before us lay the sea. We crossed large frozen lakes and several times the ice-cover broke, but owing to the speed we came out all right. In a few hours more than 40 kilometres were behind us, but when the gale was at its height we had to take down the sail as the speed became dangerous; then, however, we could make out the depôt with our field-glasses. Here a large glacial stream stopped us, and, utterly exhausted, we were glad to camp, knowing that the next morning would bring us sufficient food.

During the night one dog died from starvation. Crossing the river we found very difficult, and one of the Eskimo had a very narrow escape. When we reached the cache the oldest Eskimo, who during the whole journey always had taken upon himself the hardest work, collapsed. I stayed by him myself while the other Eskimo went to find their countrymen, who had promised to camp here in 80° N. lat. to support our return to Inglefield Gulf.

We had left our tent on the other bank of the river, but, sheltered in a cave under a big stone, my patient partially recovered during the course of the two days' waiting, when the expected help came. At the main cache, provided with fresh meat and garments, we all soon recovered, and I resumed my scientific investigations.

In the middle of September we passed the front of Humboldt Glacier, ascended the inland ice again at Rensselaer Bay, and on October 1 our sledges rushed down the glacier behind the headquarters at Robertson Bay. Two hundred days had passed since we started. We had carried out our plan and we had all returned safely.

Geographical Results.

In planning and preparing my trip I tried to secure the best facilities for a survey of the northernmost parts of Greenland, whereas surveying work in other sections of the route was not especially provided for.

The surveying outfit was as simple as possible. It consisted of one transit with a tachymetric appliance, one small plane-table, one prismatic binocular, two photographic cameras with eight hundred films, three aneroids, and one hypsometer. I started the survey on May 5 in De Long Fiord, the northernmost point reached in 1917, and finished exactly one hundred days later on August 12 at the Humboldt Glacier.

Along the northern coast of Peary Land and round the head of Independence Fiord the survey was based on triangulation, the Eskimo building big cairns of snow blocks, up to 4 metres high, on the ice, and on the land of stones. Thus very good connection between most of the stations was secured. The height of 1300 hilltops was measured.

The cartographic material is not entirely continuous. Because of prolonged snowstorms I had to give up my intention of supplementing the surveys made by the Danmark Expedition of the tracts from Frederick Hyde Fiord southwards. Twice on the inland ice we totally lost sight of land for several days. My work therefore will result in the following series of maps, partly forming a continuation of my previous mapping, and partly covering new and independent sections.

1. Of the north coast of Peary Land from De Long Fiord to Frederick Hyde Fiord (1/500,000), we had previously only a rough sketch by Peary. The coast proved to be more indented to the west, with to the east a more unbroken trend than was supposed. The Weyprecht Inlet continues far into the country, and Lockwood Island is broken by a narrow sound.

Between Cape James Hill and Cape Bridgman the coast shows level gravelly plains, and the Moore Glacier does not reach the sea. Two stations north of Cape Morris Jesup in 83° 46′ and 83° 50′ N. lat., yielding a base line of 7 kilometres, makes the map around the northern point of Greenland very rich in details.

2. The southern parts of Peary Land from Schley Fiord to Wandel Valley (the " Peary Channel "), 1/500,000, were only superficially known from the map of the Danmark Expedition. Eastward only the outline of the coast and a few details inland had been determined, and the section toward the west was totally unknown. Wide plains with a number of considerable rivers especially characterize this region.

3. The tract round the head of Independence Fiord, 1/300,000, comprising Mylius Erichsen Land from Hagen Fiord westward with Astrup Fiord, Academy Glacier, Vildtland, Marie Louise Glacier, Adam Biering Land and the tracts to the north, Heilprin Land, the southern parts of Wandel Valley, Brönlund Fiord, and Erlandsen Land.

The " Peary Channel " is a big valley, Wandel Valley, the floor of which is only a few hundred metres above sea-level. The valley, in which a big narrow lake occurs, connects the head of J. P. Koch Fiord with Jörgen Brönlund Fiord. A system of valleys crossing Adam Biering Land led to the erroneous supposition of a channel leading to the head of Independence Fiord.

4. The southern part of Victoria Fiord, the southern part of Wulff Land, and the eastern part of Warming Land, 1/500,000. This section was totally unknown before. The Victoria Fiord proved to continue southwards to 81° 30′, and thus to be the largest fiord of the north coast. In 1917 I was stopped in this fiord at 82° 10′ by impassable much-fissured ice which I supposed to be the inland ice; now it is shown to be great floes of floating inland ice from the glaciers south of Nares Land. De Geer Land is an island, and south of it lies another island of considerable size, separated from Wulff Land by a narrow sound. Wulff Land extends down to 81° 20′, considerably farther to the south than I had supposed in 1917.

5. Petermann Glacier; the eastern and southern part of Washington Land. Washington Land was previously mapped as a narrow strip of ice-free coast. To my surprise it extends eastward quite to 59° W. long. and is thus more than 100 kilometres broad. A great deal of the recently explored land drains into Petermann Fiord. The very deficient map of the coast north of the Humboldt Glacier has been reconstructed. Here the Cass Fiord proved to be of much greater extension than I had supposed.

Finally, I must mention that the big glacier tongues from the ice-cap have been incorporated in the surveys so far as time would permit. During the journey of 1917 the lower parts especially of these glacier tongues were studied from the sea ice. During this journey I had a

good opportunity of investigating their origin from the inland ice. The mapping of Academy Glacier and Petermann Glacier has been done with especial care, with curves for intervals of 100 metres, and also from Ostenfeld, Ryder, and Humboldt glaciers I have numerous observations on the orography, fissure systems, lakes, rivers, etc.

History of "Peary Channel."

When in 1892 Robert E. Peary made his first traverse of the ice-cap, he arrived on June 26 at a point about 82° N. lat., 40° W. long., where broad stretches of ice-free land stopped his projected northward journey. From this point he had an excellent view over the whole south-western section of Peary Land, and he was able to see the central parts of Wandel Valley as a grand depression continuing towards the south-east into the country as far as sight permitted. To the north the depression bifurcated, sending one branch in the direction of Nordenskiöld Fiord, the other towards the north-east. The latter branch does in fact terminate at the head of J. P. Koch Fiord, but as this fiord was not discovered before 1917, it was only natural for Peary to suppose that it connected with De Long Fiord.

During the following days Peary went south-eastward in a direction parallel to the depression, and a couple of times during this march, looking down through ravines, he was able to see the floor of the depression, which each time presented itself as a smooth surface of ice, being either sea ice or the surface of a lake. Beyond, Peary saw all the glaciers and rivers going down to the depression, the trend of which he was able to follow so far towards south-east, that he could safely state the depression to connect the fiords of the north coast with Independence Fiord. From Navy Cliff Peary mapped a part of this fiord, the head of which he could not see, but he supposed the depression to debouch here. In the report of Peary it is spoken of as a channel, but we have to notice that this channel is only indicated on a general map of his whole expedition, not on the special map based on actual surveys from Navy Cliff. Peary's partner, E. Astrup, expressed himself very distinctly in writing about what they saw ('Blandt Nordpolens Naboer,' Kristiania, 1895, p. 206): "In any case it is a fact that a continuous broad ravine or canyon, limited by bluffs several thousand feet high, exists, and there can only be some doubt whether the floor of the central part of this depression is above or below the surface of the sea."

Three years later Peary came again to Navy Cliff, but, owing to several misfortunes, he had to return without new discoveries. During 1900 he travelled along the northern coast of Greenland and made out approximately the utmost parts of the country north-east of the "channel." This country, supposed to be an island, was in Danish maps called Peary Land. After the voyage in 1900 Peary turned his mind to the North Pole, and did not afterwards occupy himself with the geography of Greenland.

In 1907 Mylius Erichsen, Hagen, and Brönlund surveyed Independence Fiord in its whole extent. On May 31 Mylius Erichsen probably camped at the mouth of Astrup Fiord; at least Hagen on that day went up the hills on the east shore, and already from this point he was able to see the head of Independence Fiord closed with glaciers, so that a termination of the "Peary Channel" here was impossible. Next day the party went eastwards along the shore until they sighted Navy Cliff. On a low naze they built a cairn, deposited a report, and Hagen made his surveys. I took out the report on 26 June 1921. The first part of it reads:

"June 1st 1907, abt. 81° 55′ Lat. N.

"To-day the undersigned accompanied by Mr. N. P. Hoeg-Hagen, lieutenant of the Royal Danish Infantry, and the Greenlander Jörgen Brönland came with 3 sledges, 23 dogs, to this naze, where our position was fixed astronomically. We were at the north coast of Academy Land, discovered by Robert E. Peary, having Academy Glacier and Navy Cliff to the west, Heilprin and Melville Lands to the north. By our closer investigations Independence Bay proved to be a fiord, as the inlet to a channel supposed by Peary does *not* exist. Heilprin Land and Navy Cliff are in fact the same land, having a local glacier discharging into a small bay, which Peary from his standpoint far behind on Navy Cliff must have mistaken for the inlet to a sound. Several of the small islands mapped by Peary as lying in this bay are, in fact, one continuous stretch of low coast-land, close to the outer border of the next glacier."

Mylius Erichsen set forth the same day. We know that Hagen had still one survey point north of this cairn, and probably they camped there for the night. The perspective sketch by Hagen (*Meddelelser om Grönl.*, vol. xli, No. 1, pl. ix.) shows the head of Independence Fiord drawn from this point. The next day Mylius Erichsen marched to Jörgen Brönlund Fiord, and from another sketch of Hagen (*ibid.* pl. v.) we know that he (June 3) found himself a little to the east of this fiord.

As is well known Mylius Erichsen and his comrades never returned; but the corpse of Brönlund was found, and with it the papers of the surveyor Hagen, two incomplete maps, and some drawings. One sketch, referred to above, showing the inner parts of Independence Fiord is especially interesting. The piece of paper on which it was drawn was not large enough to contain the very head of the fiord, therefore neither Academy Glacier nor Vildtland and Heilprin Land are shown.

In 1910 Mr. Einar Mikkelsen went from Shannon Island over the ice-cap to Danmark Fiord and reached Cape Rigsdagen May 27. In the fiord he found two reports from Mylius Erichsen, one of them stating laconically the non-existence of the Peary Channel. As Mikkelsen's traverse had been very difficult and as his base was far to the south, he had to return with the reports without making investigations about the

question himself. The surprising report did not reach Denmark before 1912.

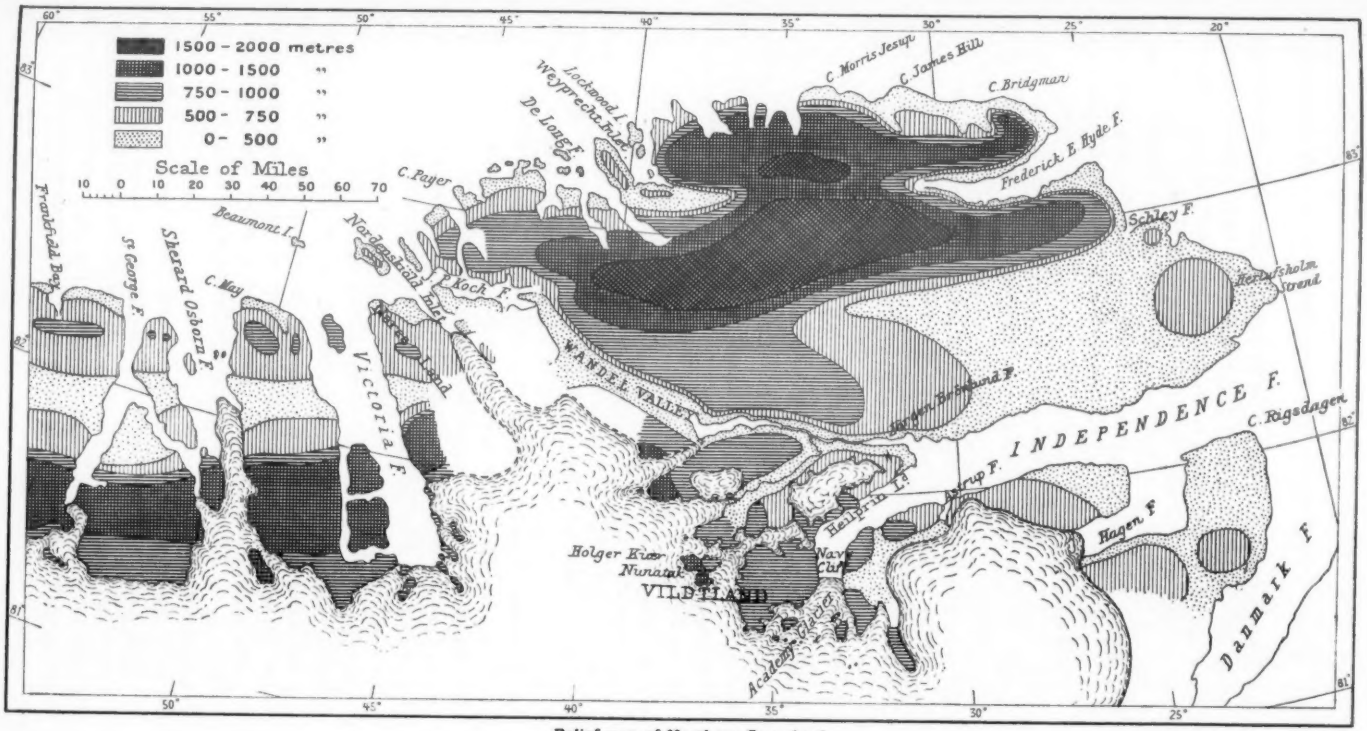
In the same year Messrs. Knud Rasmussen and Peter Freuchen left Thule in north-west Greenland, and went over the ice-cap with the aim of surveying the Peary Channel. They reached Danmark Fiord May 9, passed Cape Rigsdagen one month later, and finding no report there they were unaware of the discoveries of Mylius Erichsen and continued into Independence Fiord. As their route followed the northern shore, they did not detect the non-existence of Peary Channel before they reached the very head of the fiord. They had a difficult crossing of ice-free country, came to a smaller valley, Valmuedalen, went over the inland ice to Navy Cliff, and hence to the west coast. Mr. Freuchen made a sketch-map, the first mapping of the regions through which Peary supposed the channel to run. Although this map does not agree with the reality in all points, the observations of both travellers showed clearly that the grand depression described by Peary had no connection with Independence Fiord.

Mr. J. P. Koch worked up and published the sketches of Hagen (*Medd. om Grönland*, vol. xlvi.) and compared them with Mr. Freuchen's map. The glacier between Heilprin Land and Navy Cliff Land closing the " Peary Channel " had been christened by Mylius Erichsen Marie Louise Glacier.

In 1917 Mr. Knud Rasmussen travelled along the north coast of Greenland in order to explore the northern part of the " Peary Channel " supposed to join Nordenskiöld Fiord. The present writer acted as surveyor on this expedition. We found the Nordenskiöld Fiord nearly filled by a huge glacier, and found a new fiord east of the former. This fiord, christened J. P. Koch Fiord, stretches about 50 kilometres inward from the coast and is continued by a valley, but owing to our unfavourable situation we could not make a detailed exploration of this section.

In 1921 the present writer skirted the whole coast of Peary Land and June 8 reached Brönlund Fiord. Already from long distances the physiographic features had clearly shown that an extensive valley leads from this fiord far into the country. And on June 18 I was able, from a hilltop of 800 metres far from the shore, to get the first convincing view of the enormous drainage system to the big lake in Wandel Valley, from which it discharges into Brönlund Fiord. Here I clearly realized that I saw again the grand depression seen by Peary and Astrup twenty-eight years ago. One month later on the ice-cap, I saw the depression sending off a branch in the direction of Nordenskiöld Fiord and continuing northwards to the head of J. P. Koch Fiord, being the valley I had seen there four years before.

As so often before in the history of geographical discovery, an idea, a supposition, has caused a number of expeditions having the same aim but yielding very different results. Peary and Astrup detected the



Relief-map of Northern Greenland.

big depression separating the ice-free Peary Land from the ice-bound Greenland proper. Mylius Erichsen and Hagen stated the non-existence of a channel from the head of Independence Fiord, and their discovery was brought to light by Mikkelsen. Knud Rasmussen and Freuchen mapped Valmuedalen, but did not find the big depression of Peary; and Knud Rasmussen and Lauge Koch surveyed Nordenskiöld Fiord and found it filled by an enormous glacier. Each time people said: "The Peary Channel does not exist"; even the great depression they could not find again. Nevertheless Peary's statement was largely correct; the great depression connecting the fiords of the north coast with Independence Fiord does exist. Only it does not connect Nordenskiöld Fiord with the extreme head of Independence Fiord, but rather J. P. Koch Fiord—not known at all to Peary—with Brönlund Fiord, of which he had seen the outlet only from a great distance. Between these fiords a big and broad valley—Wandel Valley—extends with a long and narrow lake in its central parts.

Nature of Peary Land.

Morphologically speaking, Peary Land may be considered an island having a drainage system of its own. And during the great post-glacial subsidence, when the land was 300 metres lower than now, the big lake was part of the sea and Brönlund Fiord extended more than 100 kilometres into the country. By far the greater part of Wandel Valley, or perhaps the whole of it, was then submerged.

Physiographically Peary Land may be divided into two very distinct sections, a northern mountain range of 2000 metres or more, and a southern plateau nowhere over 1000 metres. The limit of the mountain range trends from Schei Fiord to a point a little south of the head of J. P. Koch Fiord. The northern section may be further divided into two subsections by extensive valleys as well from the east (Fr. Hyde Fiord) as from O. B. Böggild Fiord, yielding two parallel chains. The northern subsection, forming the coast along the northernmost point of Greenland, is distinctly mountainous, the heights generally between 1000 metres and 1500 metres. Especially the region west of the northernmost point is very rugged. Its picturesque beauty is further emphasized by numerous local glaciers of greater or less extent filling up the valleys. Also the southern subsection is highest to the west, especially in the regions south of De Long Fiord. Farther eastward the hills are only about 1000 metres, *i.e.* half the average height of the peaks in the central and western parts.

The southern plateau section of Peary Land reaches its maximum heights, 800–900 metres, beside Wandel Valley. Hence the dip towards east and north-east is gradual until at about the 28th meridian the height is only 500 metres. Farther eastward the dip continues until the 24th meridian, where a big plain occurs between Schley Fiord and

Independence Fiord, only 100–200 metres above the sea-level. East of this plain is a plateau with an average height of 500–600 metres, having isolated hills up to 700 metres.

For the sake of completeness I may also mention the regions south of Wandel Valley as far as they are known, and the northern part of Mylius Erichsen Land. The surface is sculptured into a great number of valleys and ravines, most of which are still filled by glaciers and only a part are ice-free. Nevertheless this section, as well as the northern part of Mylius Erichsen Land, forms a direct continuation of the southern plateau part of Peary Land. As we might suppose, this plateau rises to the south-east; several peaks on Vildtland are nearly 1000 metres high. On Holger Kiær Nunatak the plateau surface is 1000 metres or more above the sea, and west of the nunatak, on the ice-cap, I found moraines, showing that the surface of the plateau here reaches altitudes of 1200–1300 metres.

NOTES ON AN OVERLAND JOURNEY FROM CHUNGKING TO HAIPHONG

B. G. Tours, C.M.G.

Note: Names of towns given in the Postal Guide have been made to conform to its spelling. When the name is not in the Guide the probable Postal Guide form is placed in brackets following the name as spelled by the author on the Wade system.—ED. *G.J.*

THESE Notes are a "by-product" containing matters of general interest apart from the special opium questions which were the object of the journey. The opium questions were dealt with in separate reports.

On 3 March 1917 I received at Ichang in Central China a telegram from the British Legation at Peking, inquiring by what date I could reach Chungking in order to inspect the provinces of Kweichow and Eastern Yunnan in accordance with the Anglo-Chinese Opium Agreement of 1911. It being the low-water season, there was no steam traffic between Ichang and Chungking, and the passage had to be made by Chinese boat, the average passage by houseboat being twenty-four days and by "wupan" (a boat rather larger than a sampan) nineteen days. Allowing a few days for the arrangement of my work at the Ichang Consulate and for my travelling preparations, I replied that I could reach Chungking by the end of March. On March 6 I received definite instructions to proceed to Chungking accordingly and to travel thence southward through Kweichow and Eastern Yunnan; and on March 10 I left Ichang in a wupan.

The journey from Ichang to Chungking by river has been described sufficiently often; but I may mention that I observed two noteworthy

local industries being carried on at points close to the river. There were many small surface coal-mines, worked by three or four men; the mines rarely went more than 15 or 20 yards into the earth; the coal I saw taken out was slaty and inferior, but presumably fills the requirements of the mine's locality at a reasonable price. For some few miles below Wanhsien a considerable number of men occupy themselves in the low-water season by washing for gold in the bed of the Yangtze. Their appliances are primitive: a shovelful of Yantgze sand is put into a perforated rocker, the finer sand which escapes through the perforations falling on to an inclined board down which it is flushed by water, any particles of gold falling into corrugations in the wood and being retained there until collected. On a daily average one washing machine collects gold to the size of a large pea.

I reached Chungking in the evening of March 27, and by March 30 my preparations for the overland journey were completed. Twenty coolies contracted to go with me from Chungking to Hokow on the China–Tongking border for 60 cents a day per man, with a reduced payment of 20 cents per man for any rest-day. Ten coolies were for the baggage, six for my chair, and three for my servant's chair; the remaining man was a groom for my pony, a Kweichow stallion of about 12 hands. This pony was never sick or sorry; a heavy day's work, or a day of specially pestilential weather, worried him not a bit; on rocky or slippery mountain paths, no matter how steep, he was as surefooted as a goat. I bought him for $51 at Chungking, and sold him at Hokow for $30.

On the morning of March 31, in pouring rain, my caravan started from Chungking. We crossed the river and dived in among the hills opposite Chungking. In less than an hour we had passed the last of the straggling bungalows which constitute the summer residences of the foreign community of Chungking.

The baggage coolies, with my servant, had started an hour in advance, with orders to have things prepared at our day's destination. I travelled "self-contained" for each day, and I found this a convenient arrangement. My carrying-chair was fairly commodious, and in it I was able to stow a rug, an overcoat, a mackintosh, sun helmet and sun spectacles, a despatch box with my important papers and some money, a writing-case with writing materials and note-books, a carbine and cartridges, a photographic camera, a walking-stick, a lunch-basket, and several small articles such as a pair of prismatic field-glasses, an aneroid barometer, a pocket sundial, and a revolver. The chair and the pony always kept with me.

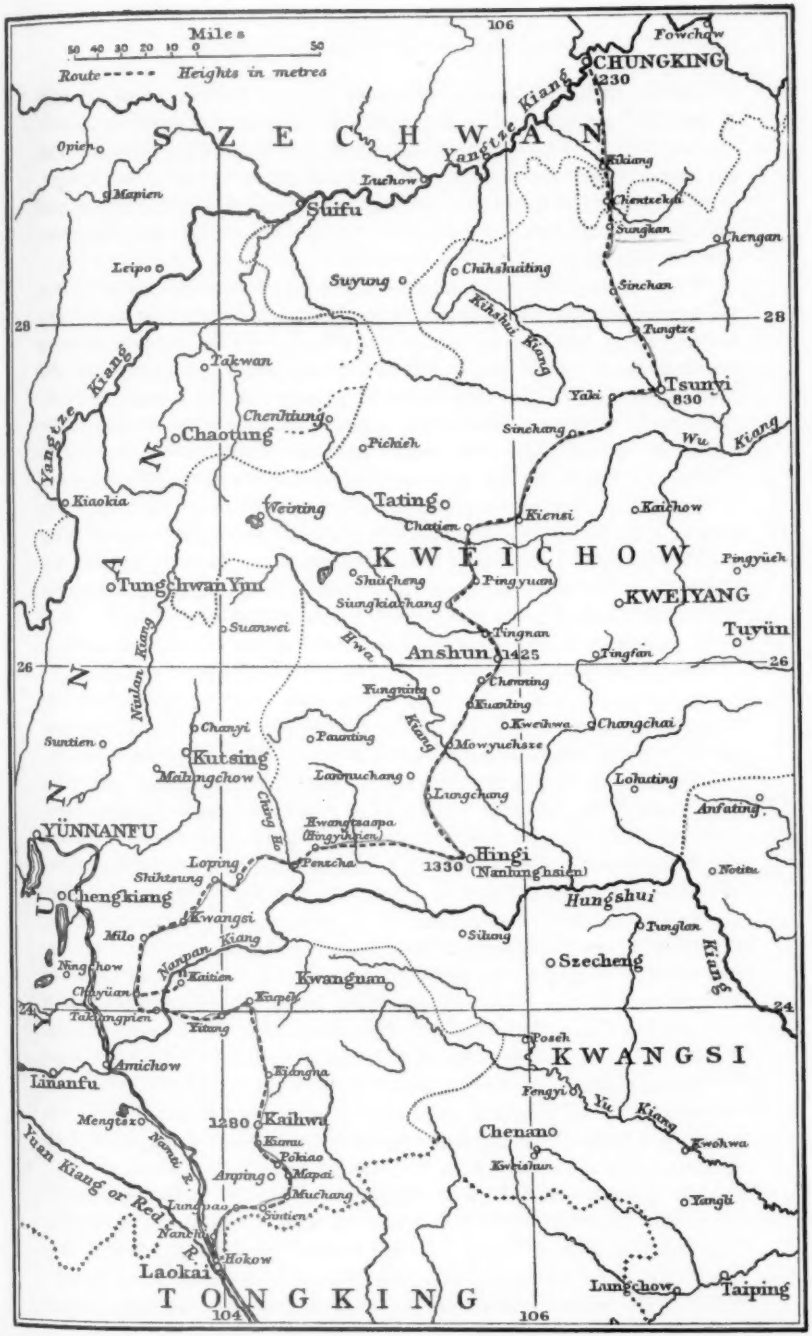
During the five days from Chungking to Sungkan the weather was vile: continual rain which not only obscured the view and damped the spirits but made the steep stony paths very bad going. My escort consisted of a few local police, who convoyed me to the confines of the next village, where they were replaced by a similar escort. No Chinese

2. THE PAISHUI-HO WATERFALL, SOUTH OF CHENNING IN KWEICHOW, WITH A DROP OF 250 FEET

1. APPROACH TO THE CHI-KUNG-PEI PASS NEAR KUAN-LING, KWEICHOW

3. WOMEN OF THE "CHING" (DARK-CLOTHED) MIAO TRIBE (ANSHUN, KWEICHOW)

4. MIAO TRIBESPEOPLE, WITH MUSICIANS IN FOREGROUND



Mr. B. G. Tours' route through Kweichow and Yünnan.

official travelled with me over this portion of my journey, so that I had to find my own quarters for the night. My servant had orders to select the inn with the least dirt and discomfort, and if he really did carry out his instructions it is fortunate that I did not put up at any of the others. Noxious odours of the horror and variety common to Chinese towns and villages were of course unavoidable; but the town of Kikiang deserves special mention in this respect.

From Chungking to the border of Kweichow province the road is a steady ascent from the Yangtze valley, leading through hills and dales innumerable; pleasing country to the eye, though the paucity of trees is conspicuous. Rape was in full flower, imparting a brightness to the landscape, even in the dull rainy weather. The road was not very frequented: a few coolies carrying produce, usually rock salt, armadillo skins, or varnish-tree nuts, were the only travellers we met. At Chentzekai I visited some iron-smelting works, the output from which is 2400 lbs. of rough iron plates per diem. The ore is taken from the hills at Chentzekai, the water-power of a small mountain stream being utilized for the furnace fans; being dependent on the rainy season, the power is too variable for any larger purpose. A leading feature of Chentzekai scenery is the great number of blind beggars.

I crossed the Szechwan–Kweichow border on the morning of April 5, at a height of 3560 feet above sea. The provincial boundary is marked by two stone columns, each about 12 feet high, standing 10 yards apart. The Szechwan column is old and weather-worn, while the Kweichow stone is by its appearance recent and new. Soon after crossing the provincial border I met the Chinese delegates from Kweiyang, and after due ceremony we proceeded on a sort of triumphal march for four days, to the town of Tsunyi. Each village and town through which we passed was beflagged and decorated with arches of evergreen, with inscriptions of welcome and of prospective joy at the abolition of opium. Other schemes of honorific device were left to the taste and ingenuity of the inhabitants; and all kinds of household implements were laid out by the roadway to add to the glory of the occasion. Tables with pots of flowers were frequent, and in one place I observed a triumphal arch decorated lavishly with family photographs. The five-barred national flag of China was always the chief decoration; it waved at every yard of this portion of my journey, often displaying a supreme disregard of correct tint, green, magenta, or purple stripes being not uncommon. In one case I noticed that the white Mohammedan stripe was provided by a small towel, sewn in between the Mongol and Tibetan lines.

The delegates feasted me at Sungkan, their efforts including a bottle of Florida water and one of Crosse and Blackwell's vinegar, as beverages. They handed them to me as "foreign wines," explaining that they had themselves tried them, but that they were not connoisseurs of foreign liquor. The senior Chinese delegate was an interesting companion, having

literary accomplishments and being well versed in Chinese lore. A native of Chekiang, he had attached himself to the province of Kweichow, and had written a guide thereto.

At Sinchan we met the special military escort sent from Kweiyang to accompany us through the province. I was assured that two hundred men had left Kweiyang to join us, but only eighty appeared, the rest having found the march from Kweiyang so strenuous that they had fallen out of the ranks on the way. They were as smart soldiers as I have seen in China, and were equipped in full marching order, with Japanese-made gear.

In spite of the general height of the country in the north centre of Kweichow, the soil and climate are excellent for agriculture, and crops of rape, peas, and beans were strong and healthy, particularly the beans. Irrigation of fields in the upper levels is contrived by means of water-wheels (shui-ch'ê), some of which are 100 feet in diameter. Smaller wheels of a similar kind are used for other agricultural purposes. I observed one simple and ingenious device for pounding cereals: a large and heavy piece of wood, shaped like a spoon with a heavy weight at the "handle" end, is balanced on a pivot; the water-wheel serves the water into the spoon, which fills and overbalances, elevating the handle weight and at the same time emptying the spoon; the handle weight thus falls heavily into a stone receptacle containing the cereal, and the process then automatically repeats itself.

Tungtze ("Varnish Tree Town") was the first town of any size through which we passed in Kweichow. It was much decorated in our honour; and the magistrate of the town informed me confidentially that he felt a particular personal pleasure at my visit, as it had enabled him to make use of decorations which he had prepared some time previously in celebration of an anniversary of President Yuan Shih-k'ai, but the use of which had been indefinitely postponed by his untimely death.

The main feature of Kweichow scenery is the hill peaks, which rise conically in thousands from the Kweichow highland plateau, the plateau itself averaging about 4000 feet above sea-level. The cone hills rise to a height of 1000 to 3000 feet above the plateau (Illustration No. 1 gives a good idea of this feature of the scenery). The sides of the hills are as a rule too steep for cultivation, and, no doubt owing to the scantiness of the population, no attempts are made to terrace them. The population of Kweichow province is estimated at 7½ millions, of whom 4½ millions are aborigines, principally of the Miao tribes.

The Chinese natives of Kweichow are a poor and unenterprising lot of people. Commerce in the province is almost entirely in the hands of Szechwanese merchants, and in nearly every town the most prosperous-looking building is the house of the Szechwan Guild. The sparseness of the population and the difficult nature of the country are hindrances

to agricultural development, while the limited and poor communications preclude mining enterprise. In many localities coal-mining is carried on on a small scale, the coal being used locally at a cost of $2 (about 4*s*.) a ton.

At Tsunyi the local magistrate feasted us. He was dressed in Chinese clothes, but wore a bowler hat—the accepted insignia of provincial officialdom under the Republic, and was sharply reprimanded by one of the Chinese delegates for sitting down to dinner without having removed his head-gear.

The chief industry of the Tsunyi district is the weaving of silk cloth from " wild " silk. The silkworm is fed on the leaves of scrub oak, the resultant thread being coarser than the mulberry-fed product. A silkworm owner rents a patch of scrub oak, into which he turns loose his worms, until every particle of leaf in the patch is devoured. The worms are then collected, and if requiring further sustenance are removed to another rented patch. The woven cloth is in appearance a coarse variety of tussah. The looms are narrow, 20 inches wide; and the cloth sells locally at 50 cents (about 1*s*.) a yard. The Tsunyi Silk Guild is an important institution. I had some conversation with the Director of the Guild, who told me that the Guild was making experiments to discover if the worms will feed on other leaves, with a view to improving the character of the silk.

Leaving Tsunyi we turned westwards into somewhat wilder country, passing the ruins of Lo-Min-Ch'êng (Lomincheng), a walled city which suffered some two hundred years ago for its participation in the rebellion of Yung Lung-hsi. The country was still hilly, and a level piece of path was rare; the rocks, which in the ascent from the Yangtze valley had been chiefly limestone, were now granitic; the soil was poorer, and the crops correspondingly thinner. Among the produce being carried towards Tsunyi I saw several skins of small tawny deer and some of large grey wolf. Trees were more frequent, and among them I noticed some species that had not occurred further north—fan palms, and the very decorative wild pipa tree (*Rhododendron fortunei*).

There were many otters in the river at Sinchang, a town about halfway between Tsunyi and Kiensi. I saw one skin which measured 3 feet 9 inches from tip to tip. The local price is 5 taels (about 13*s*.) a skin.

At Kiensi we heard that at Tating and Pichieh, two towns high in the mountains to the west, snow had been falling for two days. The Tating and Pichieh districts, extending as far as Weining, are among the highest in the province, and are largely inhabited by the Black Miao aborigines. The Chinese delegates wished to proceed *viâ* Tating, but I had planned to go southwards from Kiensi, although the road was reported to be difficult. We were travelling at an average altitude of 4500 feet under somewhat trying weather conditions, for in addition to

5. IRON CHAIN BRIDGE, 215 FEET LONG, OVER THE HWA KIANG RIVER IN SOUTHERN KWEICHOW

9. IN THE RAVINE OF THE TIENG-SHENG-KIAO, SOUTHERN KWEICHOW

7. A PIECE OF THE ROAD NEAR KUMU, EASTERN YUNNAN. HILLS TYPICAL OF MANY PARTS OF SOUTH-WEST CHINA

8. THE YUNNAN-TONKING BOUNDARY AT HOKOW-LAOKAI

In lower left corner the Namti empties itself into the larger Red River, with the French town of Laokai beyond. On the right, across the Red River, is the French military post of Kokliu.

the continual rain the temperature varied greatly during the day, the morning and evening being extremely chilly and the midday hours oppressively warm. It was very difficult to clothe oneself in the morning suitably for the day.

Crossing rivers, when the route lay off the main road, was always a difficulty, and particularly at a time when the waters were swift and swollen with the rains. We had to send messengers ahead to collect all available craft as ferry-boats: in out-of-the-way places the fleet would be three or four small cockleshell boats in various stages of disrepair. We were fortunate in having no accident worse than an occasional wetting in embarking or disembarking. On the main roads bridges, usually constructed in arches of stonework, were well built and in good repair. In South Kweichow we crossed a suspension bridge over a deep valley of the Hua-chiang (Hwa Kiang). This river crosses one of the main routes between the provinces of Kweichow and Yunnan, and has a rise and fall of from 40 to 50 feet in normal seasons. Former bridges over this valley have invariably been swept away; and it was in the year 1897 that the feat of throwing a suspension bridge on two iron chains across the valley was successfully accomplished by a Chinese general in command of the local troops. A large engraved tablet of stone at one end of the bridge commemorates the work. The cost of the bridge is stated to have been 10,000 taels; but even making allowance for the usual elasticity of Chinese accounts, I estimate that a considerable portion of that sum must represent cost of transport for bringing materials to the bridge site. I measured the bridge as 215 feet in length and 10 feet in breadth. The bridge sways and swings not too comfortably; one of our delegates was only able to cross it by being carried over in his chair with his eyes shut. The bridge chains were tightened up some four years ago.

At Chatien, 30 miles south-west of Chien-hsi (Kiensi), is the Kweichow tea mart, Chatien being about the centre of the Kweichow tea-growing industry. Kweichow tea is poor stuff, and has no market outside the province.

By the side of a rivulet at Siungkiachang I saw an automatic water-worked device for making the pulp used in the manufacture of incense sticks. From an eccentric on the hub of a water-wheel a weighted arm carried a block of pine wood, rubbing it backwards and forwards on a horizontal slab of stone which was fed with a continuous trickle of water. Fine pulp was thus rubbed off the wood block and was gradually pushed into a receptacle adjoining the stone slab. So long as the rivulet runs the device requires no attention except the fixing of a new block of wood when the one in use is entirely converted into pulp.

There were many streams in the hills in the country between Kiensi and Anshun. Hills were numerous and of the fantastic shapes pictured in Chinese scrolls. Some of the hills hereabouts are of limestone, and

in them I saw many caves, some of considerable size. Underground rivers are not uncommon; at Hsiung-chia-chang (Siungkiachang) a river of navigable size emerges from the mountain side: the natives told me that this river enters a tunnel in the mountain several miles from Siungkiachang, but that nobody to their knowledge had ever attempted to explore the river in its subterranean passage.

In a temple at Tingnan (another name of which is Puting) I noticed a curious inscription on a tablet, which urged local youths to work diligently for their country and to take example by studying the lives of men who from small beginnings had become great and useful to their countries, "such as Ito in the east, Bismarck in the west, (apparently a Russian name) in the north, and the great Englishman Smith (Ssŭ-mi-tê) in the south." I am still puzzled to know to which particular member of the great Smith family the tablet refers.

Nearing Anshun small fortification walls on the hill summits are conspicuous. These fortifications were built about one hundred years ago as a defence against the Miao tribes which came down from the hills to raid the Chinese in the towns. There are many Miao in the neighbourhood of Anshun, and a rest-day at that place afforded me an opportunity of inspecting the surrounding country in which are several Miao villages of considerable size. In this and in other places I found the Miao people quite friendly and docile, though they usually regarded my escort soldiers, if any happened to be with me, with suspicious fear, doubtless based on experience.

The term "Miao-tzu" by which these aboriginal people are often described is a term of contempt, the contempt being contained in the diminutive ending "tzu." The aborigines refer to themselves as "Miao-jên," or simply as "Miao." Very few of the Miao with whom I came in contact could not understand and speak Chinese, while some of them who were pointed out to me as unable to speak or to understand Chinese and who gave an exhibition conversation in Miao for my benefit spoke a bastard tongue more Chinese than Miao. It is only in language, however, that they have become at all assimilated to the Chinese. They retain their distinctive dress and customs, they segregate themselves in villages away from any beaten track, and they do not intermarry with the Chinese. There is no cohesion between the various Miao tribes. The Chinese delegate, who is an authority by reason of his guide-book to Kweichow, informed me that there are in that province no less than seventy-six different tribes of Miao people. Differences appear to lie more in the colours and shapes of garments than in any other feature, though the delegate assured me that there are some slight variations in the dialects of the seventy-six tribes. The Black Miao are a comparatively numerous tribe and are found in many parts of the province. The only Miao I heard of as being in any state of affluence are a few of the Black Miao in the neighbourhood of Chenyüan. This tribe derives its

name from the wearing of black garments; similarly there are Red, Blue, and other Miao tribes. I inquired of the delegate as to the tribal effect of an exchange of clothes between a Black and a Red Miao; the question puzzled him, but he finally said that both men would become Miao outcasts. He saw no objection to the creation of a new tribe by the adoption of clothes of a new distinctive colour.

There are also Miao tribes designated according to the shape of their clothes, the "Long-coated" Miao, the "Short-kilted" Miao, and one tribe of particularly wild Miao, entirely innocent of garments, known as the Kala Miao. The Chinese do not know much about the Kala Miao, who indulge in objectionable practices such as the shooting of poisoned arrows, calculated to keep inquirers away from their fastnesses.

Agriculture and small farming are the occupations of the Miao people. They never live in towns: their instinct of insularity, aided by Chinese gentle pressure, has taken them to parts of the province where the poorness of the soil does not invite any disturbing encroachment from others. Their agriculture is thus often carried on under difficulties—I have seen Miao laboriously ploughing a small tract of almost inaccessible hillside, the soil of which was laid among rocks—and the resultant crops are just sufficient to keep the colony alive and in a condition of steady poverty.

I visited some of the Miao huts near Anshun, guided by the missionary doctor of the Hospital for Aborigines at Anshun. The huts were no better and no worse than the Chinese huts of the same class of inhabitant, but the internal arrangements are somewhat different, the Miao room having on one side an upper platform roughly constructed of poles and branches and reached by a ladder. There is no proper floor to the platform; straw is laid so as to cover the gaps between the poles. On the platform thus formed the Miao family lives, the actual room of the hut being devoted to the water-buffaloes and such other animals as the family may possess. The condition of a hut occupied under these conditions requires to be seen to be properly appreciated. The Miao must be a hardy race.

The only industry I observed among the Miao, and also among the Lolo tribes in Eastern Yunnan, was the weaving and embroidery of cloth. This is all done by the women, whose holiday clothes are marvels of barbaric beauty. I obtained one embroidered coat which the wearer informed me had taken her two years' solid work to make and embroider. (I presented this coat to the Museum at South Kensington.) I also obtained from a young village belle some silver ear-rings, of which she was wearing no less than eight pairs in addition to other jewellery. The ear-rings were hammered into various crude shapes.

Numerically the Miao tribes appear to keep stationary. A missionary who has had some years of work among them tells me that they are a grossly immoral race, and this would perhaps assist to explain their low

birth rate. I found on further inquiry, however, that they are rather unmoral than immoral, their unmoralities being practically confined to the seasons of their religious festivals, when drunken orgies of the wildest description form the chief items on the programme. No doubt these bacchanalia might be traced to some common origin with the Black Lamaism of Tibet.

Proceeding south from Anshun we struck a belt of very hilly country with several deep valleys to be crossed. There was tropical foliage in the valleys, and I observed one peculiar plant called by the Chinese "Mu-yü-hua" (Wooden Fish Flower), from an extraordinary fleshy protuberance shaped somewhat like a fish protruding from the stem straight upwards. The Chinese told me it is a rare plant; I found later that its existence is well known at Kew Gardens.

At Lanmuchang I visited a quicksilver mine run by a Chinese company of about two hundred shareholders with a capital of $10,000. Five shafts have been sunk, each penetrating the hill to a distance from ¼ to 1 mile. Two hundred miners, under a Cantonese manager, are employed. The machinery is primitive. In reply to my question asking why more modern machinery was not employed, the manager explained that difficulties of transport in Kweichow and delay to the working if any part of the machinery should get broken made him cautious, and that he preferred to use devices which he could if necessary get repaired on the spot. The company was not proposing to put any quicksilver on the market until three or four years' stocks had been accumulated.

I heard subsequently that there is a suspicion against foreign machinery in Kweichow owing to the experience of Chin-chi-hsien (? = Kinki), a town which imported foreign machinery for ironworks, but the machinery was found to be of little use and was allowed to rust and go to pieces. Further inquiry showed that the machinery had been set up in an absurdly inconvenient place, far from the iron-mines.

I expected to find Hingi (also called Nanlunghsien), which is the appointed terminus of the railway to be one day built from Shasi in Hupeh, a busy town, and it certainly did show more signs of business energy than many of the towns through which I passed. I happened to strike a market day, and many Miao and Lolo people had come in from the surrounding country; but apart from the actual market, which was held in an open space outside the town, the business streets were well thronged. Nanlunghsien is in the south-west corner of Kweichow, close to the two adjoining provinces of Kwangsi and Yunnan, and is therefore a provincial border town of some importance. Its proximity to provincial frontiers renders it liable to be involved in frontier disturbances, and considerable anxiety existed at the time of my arrival on account of severe fighting at Hsi-lung in Kwang-si, opium-growers having openly resisted the force sent to suppress opium cultivation; over two hundred had already been killed, and fighting was continuing.

By avoiding the main road between Nanlung and Hwangtsaopa (also called Hingyihsien) and taking some rather rough country, I came across one of the finest bits of scenery on my whole journey—the valley of the River of the Bridge of Heaven, T'ien-shêng-ch'iao (Tienshengkiao). The paths crossing this valley wind up and down the sides of the cliffs through semi-cavernous grottoes, with canopies of stalactites covering portions of the pathway. It was a difficult crossing, but it was worth it, and I even persuaded the Chinese delegates to agree with me. This valley would be impassable when the river is in flood.

Hwangtsaopa is the native town of the Governor of Kweichow Province (1917). The most important official residing there is the Military General, an elder brother of the Governor. About a dozen patriarchs, the youngest of whom was eighty-two, called on me to press me to stay at Hwangtsaopa to rest myself, but time pressed and I had to resist their invitation. On May 1 I reached the provincial border at a small place named Chiang-ti (Kiangti) * on the Ching or Chingfei river, which hereabouts divides Yunnan from Kweichow. On May 2 I started into the province of Yunnan. The traveller into Yunnan soon becomes aware that the general altitude of the province is considerable. As the Szechwanese talk of going up into Kweichow so the Kweichowese talk of going up into Yunnan. There is also a local saying "Szechwan for heat, Kweichow for rain, Yunnan for wind," of which I was forcibly reminded as soon as we rose to the Yunnan plateau. There were occasions when the coolies could scarcely make headway against the strong winds and the clouds of dust which accompanied them. We reached our greatest heights on May 15 and 16, just before arriving at Kiupeh; our average path was about 7000 feet above sea-level; the small village at which we camped for the night of the 15th was 6810 feet up. Although in latitude 24° and in the middle of May, I found my thickest clothes comfortable.

I had not travelled far into Eastern Yunnan before the contrasts with Kweichow became conspicuous. If Kweichow seemed a poorly populated and undeveloped province, Eastern Yunnan seemed a wilderness. Villages and fields had an impoverished and attenuated appearance, and the people look poor, wild, and ragged, and of a low type; many of them appeared to be feeble-minded, and this is possible in a province where goitre is so prevalent, particularly among the women; in many villages I did not see a woman of full age who was not suffering from goitre.

One advantage which Eastern Yunnan has over Kweichow is that its communications are somewhat easier; hills are not so crowded together nor so abrupt, and here and there in Yunnan one can find quite a stretch of more or less easy road—not the uneven stone road of Kweichow, but a narrow road of red earth. Thus the Yunnanese are able to use a rough

* Apparently Penzcha on Post Office map.—Ed. *G.J.*

ox-drawn cart, a method of conveyance impossible for the stone paths of Kweichow. A Chinese official pointed out to me with pride one of the very jagged and uneven stone roads of Kweichow, remarking that it had been constructed in the T'ang dynasty (*circa* A.D. 650); but I should have had more respect for the antiquity of the road if there had been any attempt to keep it in repair during the last thirteen centuries. Road-making in Kweichow would involve a good deal of destruction before construction could satisfactorily commence, while in Eastern Yunnan a little competent handling would easily improve many of the earth roads. Postal facilities would gain much by road improvement in Eastern Yunnan, which would bring the north-west of Kwangsi and the south of Kweichow into speedier touch with the Haiphong-Yunnan railway. Many tracks in Eastern Yunnan are even now practicable for bicycles, and could be linked up so as to render a postal service by motor bicycle a possibility.

The first town of any size in Yunnan was Loping; my quarters there were fairly presentable, but I had occasion to comment to the local magistrate on the obnoxious attentions of fleas and bugs. He replied, "Ah, you should go to the Kaihwa district if you want to see them really large and fierce." I eventually reached Kaihwa, and found that he had not overstated the case.

On May 6 we had a small fall of snow in crossing a high pass in the neighbourhood of Shihtsung. The country hereabouts is very wild, consisting of bare hills with small thinly-cultivated valleys. Accommodation was usually very primitive, and on several occasions the leading piece of furniture in my room was the family coffin. South of Shihtsung we found many villages of Lolos, who were poorer in physique and also in circumstances than the Miao we had met in Kweichow. The Lolo huts are built of mud, with flat roofs which I found convenient for a sleeping-apartment when the weather was fine and the interior of the hut particularly uninviting.

On the road to Kiupeh provisions were poor, and for one whole day the bearer coolies could get nothing to eat but a very little vermicelli. On the morning of May 12, at Kaitien, they went on strike, saying that I was taking them into foodless places and that they would all starve to death. A palaver ensued, and I contrived to fill the places of the irreconcilables with local men; we moved on, and after four or five hours of struggle with very rough country we struck a valley which proved quite impassable for our caravan. We cast about for a passage for two or three hours, and I had unwillingly to decide to work back and seek an easterly route in the direction of Kiupeh; I found a route at Chuyüan, but it was very hilly.

The Shihtsung magistrate told me that within 100 li (33 miles) of Shihtsung there was a specially fierce tribe of Lolos in the hills, and that on account of their accuracy with poisoned arrows no Chinese dared to

approach them. Judging from the various Lolos whom I met, I am inclined to discount Chinese stories of their fierceness and their inaccessibility.

We were now, in spite of the altitude, plainly in tropical latitudes. Sugar-cane was taking a prominent place among the crops, and flowers, including flowering cactus, were to be seen; for two or three days we passed through clusters of dog-roses. Many of the houses in the villages were occupied with sugar-boiling. An illuminant much used in these parts is a strip of pine wood about 18 inches long and 1 inch broad. We saw many loads of these strips, on the way to the market at Amichow.

The country near the valley of the Nanpan Kiang (which river runs into the sea at the Canton delta) is very wild, and provided some of the best scenery of my journey. We camped one night at the village of Ta-chiang-pien (Takiangpien) ("bank of the great river"); at sunset I bathed in the river, but found the current uncomfortably strong. Our route next day took us up the river valley, a regular fairyland of waterfalls and thick overhanging foliage. I put up on the night of May 16 at Yitang, a small Lolo village of some twenty huts. I selected the best-looking hut and requested the old proprietor to give me accommodation for the night; he agreed without demur, the family retired to an inner apartment, and I was installed in the entrance room. My pony was placed in a cupboard in one corner of the room.

I posted some letters at Kiupeh, but the local postmaster had run out of stamps; he told me that if I would leave my letters and the money for postage he would guarantee that stamps would be affixed to the letters sooner or later. I had some curious experiences with local post-offices *en route*. In one case I had difficulty in inducing the postmaster to accept payment for postage; he explained that as it was the first occasion within memory that a foreigner had been seen in that district he could not permit me to pay for stamps. I thanked him, but gently insisted. In another town I found the post-office in charge of a small girl about twelve years old; she was the most business-like and efficient postal officer I met on my journey, and was also delightfully trusting, for she gave me her whole stock of stamps from which to select such as I required.

Soon after leaving Kiupeh our escort captured two brigands red-handed. They were ruffianly devil-may-care fellows. We carried them with us for three days, for transfer to the Kaihwa authorities. They complained of feeling tired on the second day, so ponies were allotted to them. Their feet were tied together under the pony's girth and their hands tied behind their backs, so that riding cannot have been much less uncomfortable than walking.

From Kiupeh to Kaihwa the country is rough and stony, with small hills covered with pine scrub. There is little cultivation, with the exception of the "san-chi" enclosures. This astringent root—called "san-chi," or "three-seven," because it attains maturity between its third

and seventh years—is very largely grown in the south-eastern corner of Yunnan province, and I was informed that that is the only district in China in which it is cultivated. It is highly valued as an anti-hæmorrhagic and as a general astringent. The plant is used in four ways: the root is the chief part and is powdered for external or internal use; the leaves and flowers are dried and are used with tea as a medicinal flavouring; the leaves are dried and fired and are made up into small bricks which may be infused to make a liquid concoction; and from the whole plant is made a sticky black medicinal confection, having the appearance of black treacle. The root commands a good price; locally the cost is $5 a catty (about 9*s.* a lb.), while at Hong Kong, presumably for the Canton market, it is $8 a catty (about 15*s.* a lb.).

About halfway between Kiupeh and Kaihwa we passed a curious piece of scenery consisting of some two or three hundred pillar-shaped stones, from 12 to 20 feet high. From a distance it had the appearance of a Stonehenge on a grand scale, but on reaching the place it could be seen that the stones were *in situ*.

From Kaihwa to Hokow took us eight days over very rough country as we neared the Tongking frontier. To Kumu the road leads over bare hills. Here and there in the valleys Lolo women were occupied in planting out paddy. At Kumu I was accommodated in a dilapidated temple which is used as a school. It was noteworthy in the whole of my journey to see the number of temples, both Buddhist and Taoist, which have been disestablished and transformed into scholastic institutions on Chinese modern lines; I rarely found a temple functioning as such, but in any case temple buildings are not frequent in Kweichow and Eastern Yunnan; possibly the paucity of population makes these provinces a poor field for priests. My room in the temple-school at Kumu was adorned with educational pictures; I observed drawings of "ceremonial garments" which included silk bowler hats and frock-coats of a shape and cut passing the imagination of tailors. From the condition of the class-rooms cleanliness has no place in the school curriculum.

From Kumu we went to Mapai (or Makwan) *viâ* Po-chiao (Pokiao). The path led through valleys and over hills, and as rains were now beginning to start in earnest going was often slippery and difficult. We were now travelling among the frontier tribes, principally Lolos. They were established in small colonies among the hills; each colony appeared to have something distinctive about its dress. In one village the head-dress of the women was not unlike that of the women of Marken in the Zuyder Zee or of the Brittany fisherwomen; in another village the hair is worn bound on to a circular frame giving the effect of a halo, while another form of head-wear was a red turban. I inquired the local names for the various colonies, and was informed that they are all classed under the generic term of "sha-jen," which seems to be depreciatory if not opprobrious. The Chinese in this part of the world are immigrants from

the province of Kwangtung; they retain their Kwangtung dialects, and it was usually impossible for any man in our caravan to make himself understood, or to understand, in any attempted conversation with them.

From Makwan we went through Muchang to Hsin-tien (Sintien), a Chinese fort close to the Tongking frontier. At Sintien we were housed in a fort where a small permanent Chinese guard is stationed. The soldiers all complained of fever, although the fort is on the summit of a hill 4420 feet above sea-level. The surrounding country is a sea of hills thickly covered with vegetation. The hills forming the frontier line between China and Tongking were pointed out to me, and also the locality of the French frontier fort which the French had to remove some 7 miles away because of the devastations of fever. I ascended a neighbouring hill in order to look over into Tongking. The endless hills thick with virgin vegetation and the huge masses of cloud and mist pouring up the valleys made a magnificent scene.

Next morning, May 27, we left Sintien and began the descent from the Yunnan plateau to the valley of the Namti river. The descent was fairly rapid and the difference of temperature was conspicuous. On the plateau the Lolo houses are built of mud, for warmth as well as shelter, but off the plateau they have only the roofs of mud, the walls being mere wickerwork through which the air can percolate freely. Sugar-cane and maize were now the chief crops. I saw some turnip in flower. We were travelling on a disused track; since the Yunnan–Tongking railway was built the railway track, being raised above the floods, is accepted as the highway, and few travellers take any other route.

We put up for the night at a small Lolo village of some ten or twelve houses, named Lungpao. Rain was falling in torrents, and the place was a swamp. Several of my coolies were prostrated with fever, and my quinine was in great demand. I was quartered in a Lolo house, the family kindly retiring into the loft with the chickens. I was up betimes; rain was still streaming down, but I was anxious to push on to Hokow. The road lay for a great part of the morning through jungle and through mountain streams much swollen with the rains; the chair-bearers had continually to wade through 3 or 4 feet of water. About midday we sighted the line of railway on the opposite bank of the Namti, and keeping upstream we reached the ferry at Nanchi, a point on the railway 18 miles north of Hokow. The river was high and the current swift, making the crossing not too easy.

The day had now become hot and steamy, and the Chinese settled down to rest and to await the afternoon train to Hokow. I decided, however, to continue by road, and reached Hokow at seven o'clock that evening, thus returning to comparative civilization. In Kweichow I had occasionally met missionaries, English or French; but in Yunnan I had not met a single white man.

A journey through Kweichow and Yunnan brings conspicuously

before the traveller the poorness of communications and explains in a great measure the absence of development of resources, the sparseness of the population, and the general poverty of the provinces. The future of Kweichow probably lies chiefly in minerals, with some agriculture. The altitude of the Kweichow plateau renders the climate temperate and suitable to crops; I saw rape plants 7 or 8 feet high. Eastern Yunnan is not so favourably circumstanced. The greater altitude, the poorer soil, the violent winds, all combine to restrict agriculture. Systematic afforestation might improve matters; I understand that there is a department of forestry at Yunnanfu with an adequately numerous staff, but I could not learn of any of its practical achievements. Wherever I did see trees in Yunnan the natives were destroying them for fuel, their method being to burn the trunk through until the tree could be pulled over.

Of animals and birds our party saw but few in either of the two provinces. Two young leopards, too far off for a shot, a small deer, and the wolf at Tingnan were all the fauna that crossed our vision. At Nanchi the local official showed us skins of a tiger and a large deer, known locally as a "horse-deer," both of which he had shot in the vicinity on the previous day. In the markets were many skins, wolf, deer, otter, and badger, pointing to the presence of these beasts in considerable numbers. Of birds I saw one long-tailed silver pheasant in captivity, and a large number of small green parrots, also in captivity, which are brought from Western Yunnan. The most common bird on our route was a small sand partridge, called by the Chinese "ching-ta-ta" and by the aborigines "pang-ka-ka," from the sound of its call.

Laokai in French Indo-China is separated from Hokow by the Namti river, which is crossed by a bridge. I left Hokow on June 1, and took train from Laokai to Haiphong *viâ* Hanoi. The weather was warm, and travelling by train over the swampy flats of Tongking was far from comfortable. The railway follows the course of the Red river. I left Haiphong on the morning of June 6 in a small French steamer, calling at Hoihow and Kwangchowwan. Kwangchowwan is not an impressive place; it lies on a mud flat, the channel leading to Fort Bayard, the French residential settlement, being only possible for small vessels. I reached Hong Kong on June 9 and left on the 13th, arriving at Shanghai on the 16th. After four days in Shanghai I left for my starting-point, Ichang, and arrived there on June 30. My journey of over 4000 miles, by foot, pony, chair, boat, and steamer, had taken me one hundred and thirteen days.

KING ALFRED'S SYSTEM OF GEOGRAPHICAL DESCRIPTION IN HIS VERSION OF OROSIUS

E. D. Laborde

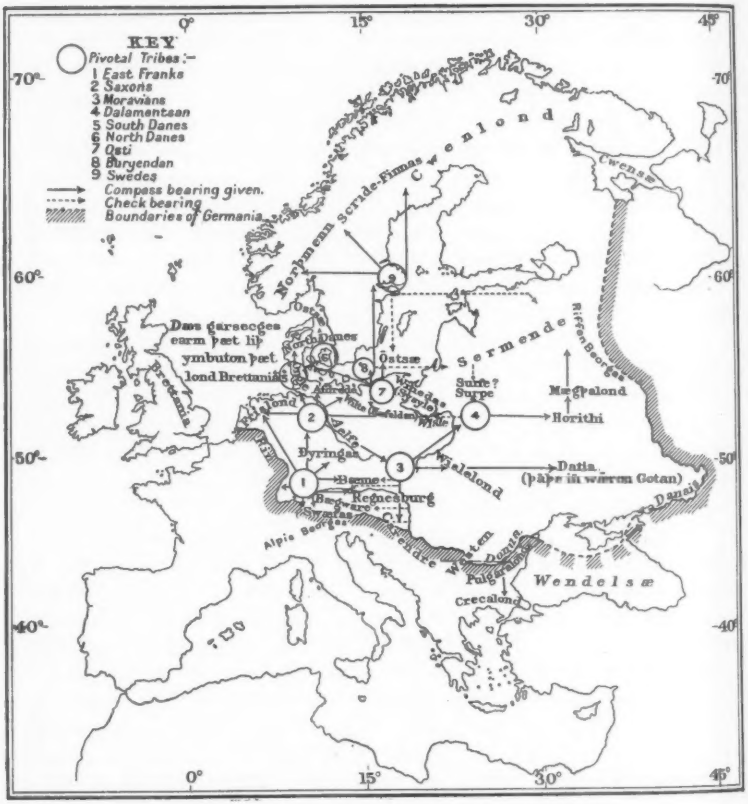
IN the steadily increasing concentration of modern scholarship on Old English literature an unduly small share of attention seems to have been devoted to the passages inserted by King Alfred in his so-called translation of Orosius.* Yet these form one of the most reliable sources of information on the geography of Europe during the ninth century, and have the further interest of being the first attempts at geographical record in England. The voyages of Ohthere and Wulfstan are the earliest accounts in our language of voyages of discovery, and indicate the methods employed by the great king in collecting information about foreign lands. The description of *Germania* is no doubt the exposition of information so gathered. That this information was carefully sifted and systematized is shown by (i) the clearness of Alfred's conception of the positions of the Germanic tribes, (ii) the consistency of his description, and (iii) its agreement with external evidence.

The description of *Germania* begins with a rough yet clear definition of boundaries, viz. the Don, the Danube, the Rhine, and the *Cwēnsǣ*. The area is then divided into three regions: (i) Continental *Germania* proper, (ii) the frontier peoples (chiefly Slavonic), and (iii) the Baltic tribes. Each region is then described separately, the description being limited to the location of the principal contemporary tribes and to the insertion of a few interesting parenthetic notes.

In his detailed treatment of these three regions Alfred, with his usual originality, invented a descriptive system of his own. This system, so far as I am aware, has not hitherto been observed. For this reason there has been some confusion over the location of tribes mentioned, and the importance of the record has not been sufficiently recognized. The principle on which the system is based is the selection of pivotal tribes in each region and the fixation of the positions of other tribes by compass bearings from the pivots. Thus the East Franks were selected as a pivotal point, and from them were fixed the positions of the Swabians (*Swǣfas*), Bavarians (*Bǣgware*) with their capital Regnesburg, the Bohemians (*Bǣme*), the Thuringians (*Þyringas*), the "Old" Saxons (as distinguished from those in the new island home), and the Frisians

* The description of *Germania* is an original passage inserted by Alfred in his version of Orosius' 'History of the World.' Orosius' history is now of no interest, though it was a standard work in the middle ages. Alfred's version is too free to be strictly termed a translation. Moreover, it omits phrases and whole passages, and includes quite new matter. Among the latter occurs the description of *Germania*, followed by two graphic passages, also original, the one describing the earliest recorded voyage round the North Cape into the White Sea; the other recounting travels in the Baltic.

(*Frisan*). By working round the region from pivot to pivot clockwise, as in Continental *Germania* proper, or anticlockwise, as in the other two regions, the king fixed the positions of the leading tribes and peoples. In the great majority of cases he fixed these positions from more than one pivotal point—a device which enables us to place the tribes on the map with a fair degree of accuracy. In each region the starting-point is in



The Tribes of "Germania" according to King Alfred.

the south-west, and is usually fixed precisely by reference to striking physical features of the country.

Hitherto it has been thought that the tribes mentioned are placed by consecutive compass bearings, *i.e.* south of the East Franks are the Swabians; south and east of the Swabians the Bavarians; due east of the Bavarians the Bohemians; north-east of the Bohemians the Thuringians, etc. But this interpretation gets us into difficulties at once, for

external evidence places the Thuringians north-west, not north-east, of the Bohemians. Again, in this interpretation the *Afdrede* * are said to be north of a section of the Danes. But later it is said that they are east of the South Danes and south of the North Danes. The root of this misinterpretation lies in the misunderstanding of the reference of the pronoun *him*. As will be explained below, the king chose nine tribes as pivotal points of his survey, and all the pronouns *him* following a particular pivotal point refer to this and not to one of the sub-points. When an offshoot is given, the king is careful to use another pronoun (*þām*); *e.g.* "East of the land of the Carinthians . . . is the land of the Bulgarians, and south of these (=*þām*) is the land of the Greeks." Or else he mentions the name of the tribe from which the bearing is taken; *e.g.* "North-east of the *Maroara* are the *Dalamentsan*, and east of the *Dalamentsan* are the *Horithi*." Mr. A. J. Wyatt came near detecting the system, for he writes in a note to his recently published 'Anglo-Saxon Reader,' p. 208: "The references throughout this sentence are clearly to the south Danes." And again, "*Him* throughout this sentence refers to the *Swēon*."

There is one apparent exception to this rule for the reference of *him*, viz. in the sentence: *ond be-ēastan him* (i.e. *Burgendan*) *sint Sermende*,† *ond besūþan him Surfe*. If, according to the rule, *him* refers to the *Burgendan*, then the *Surfe* must have been a tribe on the Baltic coast of Germany. But the other tribes in this region are fixed from at least two points; hence, it seems strange that this should be fixed from one only. Secondly, Alfred is strictly systematic in his description, and it does not seem likely that after he has already dealt with the coast tribes south of the Baltic he should return to this area from an external point, except for the purpose of checking. Thirdly, there is evidence that the text at this point is corrupt (cp. *Ōsti* for *Ōstsæ*); hence it is possible that the king wrote *þām* and that a scribe miscopied the word, writing in its place one that occurs so frequently in the formulas of direction. Assuming this to have been the case, the *Surfe* would then be south of the *Sermende*. Now, south of the *Sermende* Alfred has already placed the *Surpe*, a name so like *Surfe* as to suggest a scribal error, especially as *f* and *p* were so alike in Old English script. If the tribe intended is the *Surpe*, then the mention of it is a check bearing which is in keeping with the king's system.

There are nine pivotal points as follows:

1. **East Franks.**—The position of this important pivotal point is fixed by reference to the source of the Danube and to the Rhine: "N. of the source of the Danube and E. of the Rhine are the East Franks." Tribal positions fixed thence are (1) the Swabians (S.), (2) the Bavarians

* The *Abodridi* of mediæval writers. They dwelt on the shores of the modern Lübeck Bay.

† Is this tribe to be identified with the Sarmatians of ancient writers?

(partly S., partly E.), (3) the Bohemians (E.), (4) the Thuringians (N.E.), (5) the Old Saxons (N.), and (6) the Frisians. The accompanying diagram (Fig. 1) makes this clear to the eye.

II. **Old Saxons.**—Here the pivotal point is located by a previous compass bearing from the East Franks, by a reference to *Frīslond*, and by a bearing to the mouth of the Elbe: "W. of the Old Saxons is the mouth of the Elbe and *Frīslond*." Positions fixed from this point are: (7) *Ongle* (former home of the Angles of England, N.W.), (8) *Sillende* * (N.W.), and (9) a section of the Danes (those on the Danish peninsula? N.W.); (10) the *Afdrede* (N.), (11) the *Wilte* (or *Hæfeldan*, N.E.), (12) the Wends (*Winedas*, E.), and (13) the Moravians (*Maroara*, "a long way to the S.E.").

III. **Moravians.**—Pivotal point fixed by compass bearing from the Old Saxons. This point belongs to two regions. In the region of

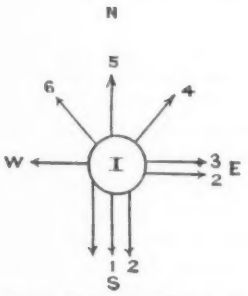


Fig. 1.—The East Frank pivotal point.

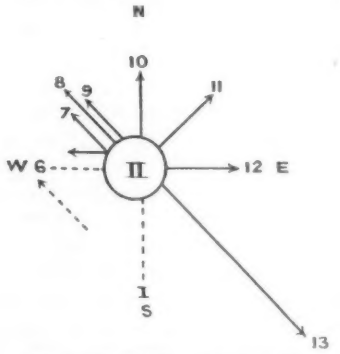


Fig. 2.—The Old Saxon pivotal point.

Continental *Germania* it provides check bearings for the positions of the Thuringians, Bohemians, and the northern section of the Bavarians (all due W.). In the regions of the frontier peoples it gives by compass bearing (S.) the position of the Carinthians (*Carendre*, 14), a position further fixed by reference to the Danube, the Alps, and the Bavarians and Swabians (*ond besūþan him, on ōþre healfe Dōnua þære īe, is þæt land Carendre sūþ oþ þā beorgas þe mon Alpīs hāt. To þæm ilcan beorgan licgaþ Bāgwara landgemāro ond Swāfa*). [From the Carinthian position runs an offshoot fixing the position, though somewhat indefinitely, of the Bulgarians (*Pulgare*). South † of the Bulgarians is placed the Eastern Empire (*Crēca lond*).] The position of (15) *Wislelond* is then fixed by compass bearing (E.) from the Moravians, [and an

* Not known. Sometimes identified with Zealand; but this would make Alfred wrong about a region he knew well. Perhaps *Sinlendi* (=the district of Sleswig).

† The text reads *be-īastan*; but this=*be-sūþan*, as often in O.E. and O.N. See M. L. R. XII. 2, 201.

offshoot eastwards indicates the position of Datia, where, the author notes, was the ancient home of the Goths.] A further compass bearing from the Moravians fixes (16) the Dalamentsan (N.E.).

The region is now complete, and the next diagram (Fig. 4) shows

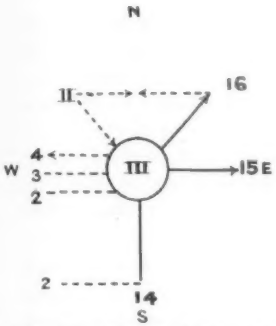


Fig. 3.—The Moravian Pivotal Point. Dotted lines = check bearings.

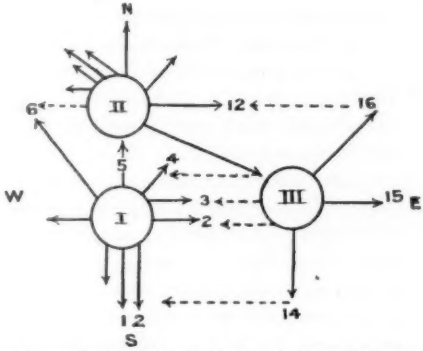


Fig. 4.—System of check bearings in the Continetnal *Germania* region. Bearings connecting pivotal points are numbered. Dotted lines denote check bearings.

the relation between the pivotal points and explains the Alfredian system of check bearings.

IV. Dalamentsan.—The pivotal point is fixed by a previous compass bearing from the Moravians (III.) and by a check bearing to the Wends (12) (see Fig. 4). New positions fixed are: *Horithi* (E.), [offshoot fixing *Mægþalond* (N. of *Horithi*) and *Sermende* (N. of *Mægþalond*)]; *Surpe* (N.).

V. South Danes.—Pivotal point fixed by reference to the North Sea ("W. of the S. Danes is that arm of the ocean which surrounds Britain"), to the Baltic ("N. of them is that arm of the sea called the *Ōstsæ*"), to the mouth of the Elbe ("S. of them is the mouth of the river Elbe"), and by a check bearing to the Old Saxons. There is also a check bearing to the *Afdrede* (E.). New point fixed: North Danes (N. and E.).

VI. North Danes.—Point fixed by previous compass bearing from S. Danes and by a reference to the Danish islands of the Baltic ("E. of them, *i.e.* the S. Danes, are the N. Danes, both on the mainlands and on the islands"). There is a check bearing to the *Afdrede* (S.). New point fixed: *Ōsti* * (E.).

VII. Osti.—Point fixed by previous compass bearing from N. Danes, by reference to the Baltic ("the Osti have to the N. of them the same arm of the sea," *i.e.* the Baltic), and by check bearings to the Wends (N.)

* Not otherwise known. Sometimes identified with the Esthonians. It is clear that they were west of the Vistula.

and the *Wilte* (S.). Point fixed: the *Burgendan* (dwellers in the island of Bornholm, N.).

VIII. Burgendan.—Point fixed by previous compass bearing from the *Ōsti* and by its nature as an island. There is a check bearing to the *Sermende* (E.) [with an offshoot check bearing to the *Surfe* or *Surpe*]. Point fixed: Swedes (*Swēon*, N.).

IX. Swedes.—Points fixed by compass bearing from *Burgendan* and by reference to the Baltic ("the Swedes have to the S. of them the arm of the sea, *Ōstsæ*"). There is also a check bearing to the *Sermende* (E.). New points fixed are: *Cwēnlond* (N.), the *Scride-Finnas* (N.W.), and the Norþmenn (W.).

One of the most striking features of the system is the regularity with which the compass bearings are given in either clockwise or anticlockwise order. And this is true not only of the bearings given from pivotal points (cp. Figs. 1, 2, and 3), but also of the movement from one pivotal point to another round the regions. On what principle the pivotal points were selected cannot be determined with certainty, but it would seem that some (*e.g.* the Saxons) were selected on account of their importance, some (*e.g.* the *Ōsti*) for their convenient central position, and others (*e.g.* the *Burgendan*) for their easy location by reference to physical features of the land. In some cases more than one reason probably guided the choice.

LOST MERCATOR MAPS

SINCE recording, in the July number, the discovery at Rome of a copy of Mercator's rare map of the British Isles, we have received from Prof. Almagiá some further interesting notes on the set of maps formerly existing in the Rome University Library The surveying sheets have now been carefully repaired, and Prof. Almagiá has kindly examined the water-marks of the paper used both for the British Isles and for the cover-sheets of the whole series. So far as it is possible to base conclusions on such evidence, the water-marks bear out the idea that the maps were originally acquired *as a set* about 1585–95. The mark on all the covers is the same, and consists of the monogram AM, which might perhaps stand for Adrien Mouchault, who according to Briquet ('Les Filigranes,' p. 708) was at work in the great paper-making centre of Angoulême in 1591. The mark on the British Isles map appears to be a monogram formed by the combination of 4, C, and A, which was much used in the Rhine country, and especially Lorraine, in the last two decades of the sixteenth century, and which occurs in a variant form in other maps of Mercator, as well as in books of the same period in the Society's library. (The 4 has probably no numerical significance. It is found also in similar combinations in printers', binders', and even masons' marks of the period.)

More interesting still is the discovery that, hidden beneath the titles of some of the maps—given in some cases, on the cover-sheets, by means of small labels pasted within an ornamental framework—there are other titles relating, it seems, to further maps of which no copies are known to exist. One of these is the map of the Seventeen Provinces of the Netherlands, of which the title-sheet, ***in English***, has been reproduced by Averdunk (from the still existing copper-plate) in the monograph on Mercator reviewed in the *Journal* for January 1919 (p. 49); the other being a map of "Teutschland, mit den umliegenden grenzen," the issue of which, as a separate large-scale map, does not seem to have hitherto been even suspected. It might perhaps be thought that these lost maps were merely the sections of the 'Atlas' dealing with the Netherlands and Germany, issued in 1585 with special title-pages, and apparently referred to in the Plantijn ledgers as *Belgia* and *Germania*,* just as other sections appear simply as *Gallia* and *Italia*, each being sold separately as well as conjointly. From those ledgers we learn that the Belgia was to be had in French, Latin, and Italian, so that the issue of an English version also would be no matter for surprise; and we find moreover that the four provinces specially mentioned in the English title are just those shown, in precisely the same order, in the first four maps of the Belgia section of the Atlas. If, however, the titles had reference to the atlas sections, we should have expected the borders to be the same as in the latter, since the same border did service even for quite different maps. It can hardly be that the ledger-entries refer to a whole series of independent maps, for they begin to appear in the very year (1585) in which the first sections of the Atlas were published.

In any case the actual maps once contained in the existing covers could not have been sections of the Atlas, by reason of the directions given for joining them together to form a single map, which could not be done with the Atlas sheets. Moreover even when first completed in 1595 the Atlas contained no special maps of America, though Rumold Mercator in his preface expresses the hope that he may eventually supply the sections on this and other extra-European regions, on which work had been begun ("inchoatum") by his father. Since a fifteen-sheet map of America had already appeared before 1593, as is proved by the Plantijn ledgers, it is puzzling to find the work spoken of as only "begun" in 1595. The expression would seem to refer merely to the engraving in a form suitable for inclusion in the Atlas.

It should be mentioned that the covers of the maps of the British Isles and of Palestine give further instances of the practice of using the same ornamental framework for quite different maps, for beneath the

* It is somewhat singular to find the *Germania* priced at 1½ florins only, as compared with 8 for the *Gallia* and 2½ for the 17 *Provinces*, and this though the German section was the largest of those issued in 1585.

pasted-on titles of both these that of the map of America is to be found. This is a further indication that we have here to do with comparatively late *reissues* (at any rate after the date of the America) of the original two maps. No doubt copies continued to be printed from the original plates as demand for them arose. E. H.

REVIEWS

EUROPE

Ancient Man in Britain.— Donald A. Mackenzie. With a Foreword by Elliot Smith, F.R.S. Glasgow and London: Blackie & Son, Ltd. 1923. *Sketch-map and Illustrations.* 12*s.* 6*d. net.*

THE character of this book can best be suggested by a series of extracts. "The great Stonehenge circle is . . . situated in a semi-barren area, but it is an area where surface tin and gold were anciently obtained" (p. 94). Geologists will be surprised to hear that Wiltshire was once a gold-producing district. There is, of course, not the slightest possibility that it can ever have been such. So far from being a "semi-barren area" Salisbury Plain was densely populated during the Bronze Age; and during the Iron Age and the Roman occupation corn was grown over a large part of it. The remains of at least thirty-six Iron Age or Romano-British villages exist within the area of Sheet 122 of the 1-inch (Popular) Ordnance Map. "When therefore we come to deal with groups of monuments in areas which were unsuitable for agriculture and unable to sustain large populations, a reasonable conclusion to draw is that precious metals, precious stones or pearls were once found near them" (p. 93). Mr. Mackenzie is referring to the speculations of Mr. Perry; by monuments, therefore, we understand him to mean megalithic monuments, such as Chambered Long Barrows and Stone Circles, though these two types of monument are of different age and origin. There is not the slightest evidence that the makers of Long Barrows in England and Wales ever possessed or even knew the existence of "precious metals, precious stones or pearls." It is geologically certain that none of these materials can ever have occurred naturally in, for instance, the Cotswolds, where there are more Chambered Long Barrows than in any other English region of similar size. There is no evidence for the "use" of pearls here before the Roman period. The picture of neolithic peoples engaged in a constant and almost world-wide search for "precious metals" is a delightful one. If they had a passion for pearls, the banks of the Thames estuary should be thickly studded with megalithic monuments. "The Hebrides may well have been the Œstrymnides of Himilco, and the Cassiterides of classical writers. Jura or Iona may have been the Mictis of Pytheas" (p. 118). On the other hand it may not! "These [Celtic artistic] patterns betray affinities with Ægean motifs, and they were afterwards developed in Ireland and Scotland. In both countries they were fused with symbols of Egyptian and Anatolian origin" (pp. 118, 119). Does Mr. Mackenzie really believe the Battersea shield (of which he gives a good borrowed illustration) to be a mongrel product of the fusion of three totally distinct styles, developed, moreover, independently in widely separated regions? And what exactly are Anatolian symbols? (The index gives no help.) "Like the Achæans, the Celts appear to have absorbed the culture of the Ægean area, and that of the Ægean colony at Hallstatt in Austria." If they could do this, they could do anything—and we long to hear more about this "Ægean colony." "They were withal the 'carriers' of the La Tène

Iron Age culture to Britain and Ireland" (p. 112). That may be; but then they must first have purged themselves of their Ægean and Hallstatt absorptions.

Dr. Elliot Smith, in his Foreword, says that Mr. Mackenzie "has made himself thoroughly familiar with the customs and beliefs of the whole world." After this remarkable statement, the author's modest claim (p. 269) comes as rather an anticlimax—"the evidence dealt with in the foregoing chapters throws considerable light on the history of Early Man in Britain."

O. G. S. C.

Climbs on Alpine Peaks.— **Abate Achille Ratti,** Mountaineer (now **Pope Pius XI.**). Translated by **J. E. C. Eaton.** With a Foreword by **Douglas Freshfield,** and an Introduction by the **Right Rev. L. C. Casartelli,** Bishop of Salford. London: T. Fisher Unwin, Ltd. 1923. Pp. 136. *Sketch-map and Illustrations.* *8s. 6d. net.*

THE election to the Papal Chair of one who had been in the past an ardent climber and a conspicuous member of the Club Alpino Italiano was an event which naturally aroused considerable interest in Alpine, and probably still wider, circles, and it was a happy idea to publish an English version of the papers contributed by the Abate Achille Ratti (as he then was) to the periodicals issued by the Italian Club. They are four in number, and were all written more than thirty years ago. Three of them describe expeditions on Monte Rosa, the Matterhorn, and Mont Blanc; the fourth an adventure which befell his favourite guide and a Milanese nobleman during a passage across the Bergamesque Alps in early spring. All are attractively written, but the three last-named owe their interest mainly to the eminent position now occupied by their author. The first is on a different plane. The expedition was a memorable one—indeed, it is rather odd that it did not receive more notice from English climbers at the time—and the account here given is in every way worthy of it. There are many good accounts of great expeditions, but they are never alike, for each of them is a reflection of the writer's personality. The paper now before us, by its clearness, its restraint, its modesty and sincerity, deserves a high place among these Alpine "classics," and one finishes its perusal with the feeling that one would like to have known the Abate in his younger days, and would have gladly welcomed him as a companion on an arduous climb.

The translator, it need scarcely be said, has done his work excellently. The book is very well got up: it supplies a brief but adequate summary of the other aspects of the Pope's distinguished career, and it is admirably illustrated, the various views of the Italian side of Monte Rosa being of exceptional interest and value.

A. L. M.

ASIA

Beasts, Men, and Gods.— **F. Ossendowski.** London: E. Arnold & Co. 1923. Pp. 326. *12s. 6d. net.*

It would be difficult to include within the compass of a single volume more sensation, bloodshed, and horror than this book contains. One gets the feeling that the writer became so satiated with intrigue and murder that he passes them lightly as events quite normal in the strange conditions in which he lived. A Polish scientist, Mr. Ossendowski was living in Krasnoyarsk in 1920 when he got word of his impending arrest by the Bolsheviki. He fled at once to the forests, and began nearly two years of adventures in the heart of Asia, which terminated only when eventually he reached Peking. After a winter hidden in the forests of the Yenisei, a winter not without its thrills, the author made southward to the Urianhai country. He and some other "white" refugees

hoped to escape through Mongolia to the Pacific, but finding this route closed through Soviet collusion with the Chinese, they boldly decided to cross the Gobi desert into Tibet and try to reach India. This part of the story moves rapidly, and we miss descriptions of the country traversed. Tibet proved unkind, for *hunghutze*, or marauders, blocked the way and killed several of the party. The remainder returned to Uliassutai, where, in company with other refugees, a long stay was made, since all ways of escape were closed. Eventually, after several reconnaissances, they reached Urga, whence by the good offices of that remarkable fanatic, General Untern von Stornberg, they got safely to Hailar in Manchuria. There is a good deal of geographical interest in the book, even if much is occupied with the complexities of political intrigue. The sections dealing with the colonists and Soyots of the Urianhai and of life in Uliassutai and Urga are full of interest. The author has also much to tell of the living Buddha, with whom he had several interviews. The whole book is a remarkably unimpassioned account of almost incredible happenings. It rings true on every page. The map is scarcely adequate for a book of this nature. R. N. R. B.

In and Around Yunnan Fou.— Gabrielle M. Vassal. London: Heinemann. 1922. Pp. 187. *Map and Illustrations.* 10*s.* 6*d. net.*

Until a few years ago Yünnan was the most inaccessible of the south-western provinces of China, all the routes by which it could be reached entailing long and tedious journeys. Thanks however to the great engineering feat of the Yünnan railway, completed by the French in 1910, the journey can now be accomplished in three days, which could be reduced to 36 hours did passenger trains run during the night.

By this southern route Madame Vassal, the English wife of a French army medical officer, travelled with her husband from Haiphong to Yünnan Fu in 1913, breaking the journey to visit the Open Port of Mengtsz, about 150 miles south by east of the capital. In Yünnan Fu, which she found sunny, cool, and invigorating after Tonking, Madame Vassal spent the greater part of the summer. She is a keen and intelligent observer and she has the gift of recording what meets the eye. In this book of sixteen chapters she deals with many phases of Chinese life and with all classes from Viceroy to chair-coolie, describing in considerable detail shops, temples, schools, theatres, and the various entertainments at which she was present. In the chapters on the history and non-Chinese races of the province, she draws largely upon the works of M. Rocher and Captain (now Major-General) Davies; and in the final chapter, written in 1921, she discusses the future of the province.

Incidentally she states that, during the Boxer Rising in 1900, the Governor-General of Indo-China was prepared to annex Yünnan as a country suitable for French colonists; but his Government objected. Madame Vassal says that France does not now seek territorial expansion, but is content with a policy of influence and commercial understanding. To carry out this policy she strongly advocates the establishment of French hospitals and schools in the province, so as to maintain and increase France's paramount interests, and she looks forward to the extension of the Haiphong–Yünnan Fu Railway to the Yangtze, and to the exploitation of the undeveloped mineral and other resources of the country. The prohibition of opium leaves tin the only legitimate export from the province of any considerable value. It is mined and smelted at Kokiu, 20 miles from Mengtsz, and goes by rail to Haiphong, whence nearly all of it is shipped to Hongkong, where it is refined and distributed. It is from this same British colony that the principal import into Yünnan (cotton

yarn) is carried, by the same route. Much dredging has been done at Haiphong to facilitate the entry of large vessels, but as yet it is little more than a port of transshipment.

The book contains a small map of China and forty-three photographic illustrations, mostly small. The names of the places naturally follow the French spelling. It has no index, and is marred by a considerable number of misprints and obvious mistakes. A. H.

AFRICA

A Naturalist in the Great Lakes Region.— Elliott R. Downing. Chicago: The University of Chicago Press. 1922. Pp. xxv., 328. *Frontispiece and 452 Figures. Price 19s. 6d.*

One of a "Nature Study" series, of the regional type, prepared under the auspices of the University of Chicago, with the surroundings of that city as its sphere of reference, this book will serve locally a useful purpose as an introduction to observation in the field. But, like so many of its kind, it attempts too much, and drags in universals along with particulars. Written in an enthusiastic vein, by a keen educationalist who has a profound respect for printed authorities, it serves up much unripe fruit along with safe nutriment.

Take, for example, the confident exposition of the planetesimal hypothesis (pp. 21–26), with the ideal section of the Earth (Fig. 22) and the statement that at an early stage the undercrust "would be very porous, similar to the contents of a basket filled with large potatoes, only the fragments would be vastly larger, more or less cemented with lava," etc.; or the elaborate lists of geological formations (pp. 31–35), with twenty or thirty subdivisions of the Keweenawan and Huronian alone; or the series of hypothetical palæo-geographical maps (Figs. 30–33, 35, etc.); or the chapter (IV.) on the Glacial Period, a medley of elementary and highly technical matter with the haphazard interpolation of a few pages of detailed mineralogy and descriptions of igneous and metamorphic rocks. Similarly in the chapters dealing with present conditions, which consist mainly of simple and well-illustrated natural history, the effort to be up to date has led to the intrusion of theoretical matter with an assumption of finality which it should not carry.

In the exposition of science for schools and school teachers, which is the avowed aim of this book, it ought to be made clear that our present explanations of the facts of Nature are generally imperfect and likely to be modified by fuller knowledge. G. W. L.

Across Equatorial Africa.— F. W. H. Migeod. London: Heath Cranton. 1923. Pp. 397. *Illustrations and Sketch-map. 30s. net.*

This account of Mr. Migeod's journeys across Africa—first, leisurely, from Libreville to Mombasa, and then, much more rapidly, from Dar es Salaam to Matadi, can be confidently recommended to the student as containing the day-to-day record of things seen and heard by a trained and painstaking observer. Mr. Migeod was no novice when he began his long trans-continental tour; he had lived many years in West Africa and was well acquainted with the Negro mentality, and with many African languages and dialects. In the travels he now describes, ethnology and philology were his chief concerns, but he also has a keen eye for topography and natural history: wherever he goes he brings vividly before us the general aspect of the district through which he is travelling. Appendices give language specimens, relationships of tribes, as based on languages, and notes on skulls of man and the anthropoid ape. There are also plates of facial tribal markings and specimens of wall-drawings, besides other illustrations.

The result, as we have indicated, is valuable. But it is all detail and fragmentary, and the book itself is something like the country described, a jungle through which the reader can only pick his way by keeping close to the author's path. And there are some four hundred pages of closely packed narrative, nearly all of it seemingly just a transcript from Mr. Migeod's journals. Apart from the collated material in the appendices, there are no general conclusions ; the student must choose from this *olla podrida* the morsels he desires. If he wants precise information concerning any region that was on Mr. Migeod's itinerary, he will get it. As the author passed through the Gabun and Middle Congo colonies of French Equatorial Africa, which are not often visited by Englishmen, that part of the narrative has a special interest. This may suffice as an indication of the contents of the book on its purely ethnographic and topographic sides.

Attention may however be called to the careful estimates of economic possibilities and to the scattered references to the relations between whites and blacks which Mr. Migeod makes or omits to make. The most notable omissions concern Christian missions. Mr. Migeod visited many mission stations ; at Kampala he stayed a week and saw much of the C.M.S. work, and he was favourably impressed by the Baganda (see chap. xi.). But nowhere, so far as we can discover, does he commit himself to an expression of opinion as to the moral or spiritual effect of Christianity upon the African. Generally as between the white trader or settler and the African labourer Mr. Migeod would appear to take the "colonial" rather than the "missionary" view (see, *e.g.*, pages 158, 187, and 293), but he is, we believe, more of a recorder of other people's opinions than of his own. At any rate he took the return journey across Africa, not for his own sake, but for the convenience and care of his two native "boys" from the West Coast.

To the general reader the book will afford good entertainment and give a faithful idea of the varied means of travel in Central Africa to-day.

F. R. C.

AMERICA

Inca Land: Explorations in the Highlands of Peru.— Hiram Bingham. London: Constable & Co. 1922. *Sketch-map and Illustrations.* 24*s. net.*

Professor Hiram Bingham's latest work, 'Inca Land,' contains the account of several journeys of exploration in Peru, made under the auspices of Yale University and the National Geographic Society of America. It is the best book that Professor Bingham has given us. Written in the simplest style, with an admirable sense of humour, it at once enlists the sympathies of the reader, and the very fact that the author refrains from stressing the many hardships encountered in his extended travels shows that he possesses the equable persistence of the true explorer, without in the least concealing the difficulties which the pursuit of archæology in the Andes presents even to the hardiest.

The book starts with an extremely vivid account of the ascent of Coropuna, which some reports had credited with being the highest peak in South America. Though the actual result proved these reports to be false (the true altitude being something under 22,000 feet), the ascent was no mean achievement in view of the sufferings of the party from mountain sickness.

Next follows an account of the exploration of Lake Parinacochas, celebrated for its flocks of flamingoes and, reputed, unfathomable depth. Alas for report! Prof. Bingham's humour comes to the rescue. He tells of hours devoted to the preparation of a knotted sounding-line 1000 feet in length, of which no more than $4\frac{1}{2}$ feet was ever wetted during days employed in sounding. Yet the

reader will the more readily pardon the author for the destruction of a fascinating tradition because of the picturesque description of the lake and surrounding country.

Other chapters deal with the Titicaca region, the Vilcanota country, and the Huatanay valley, and these are followed by an account of Cuzco viewed from an angle which most observers have failed to appreciate.

A short but excellent account of the last four unhappy Incas, vainly defending the relics of a great empire against Spanish encroachment, is followed by the history of the author's search for the remains of their final stronghold. There can be no doubt that this search was successful, and that the fortress of Uiticos was ultimately discovered. In support of his contention, Prof. Bingham's argument is well marshalled and, in the opinion of the reviewer, conclusive.

Less satisfactory are the concluding chapters, which deal with the author's darling site, Machu Picchu. This architectural complex, which Prof. Bingham was the first to describe in detail in a wonderfully illustrated article in the *National Geographic Magazine*, is a finely preserved ruin (speaking comparatively) in a geographical setting of amazing impressiveness. Prof. Bingham wishes to identify it with the Tamputocco of Inca legend, the city, dating from pre-Inca days, which was the nursery of the Inca people. This is in direct defiance of all the Inca traditions relating to their early migrations, and is, moreover, contradicted by all that we know of the development of Peruvian architecture. In this book he returns to the charge, but it cannot be said that his argument is at all convincing. That there may have been an early, pre-Inca, settlement at this remarkable site, no one can deny—there is no evidence. But those portions which the author wishes to relate to the earlier period bear all the signs of late-Inca technique.

But this does not detract from the value of the book, a sincere and vivid piece of writing, engaging in its direct simplicity and enthusiasm, containing many valuable hints to travellers in the Andes, and excellently illustrated.

T. A. J.

The Golden River: Sport and Travel in Paraguay.— **J. W. Hills, M.P.**, and **Ianthe Dunbar**. London: Philip Allan & Co. [1922.] Pp. 187. *Sketch-map and Illustrations.* 10*s.* 6*d. net.*

This joint record of a recent trip in South America forms one of the few good descriptions (in English) of that fascinating region of the Alto, or Upper Paraná, which lies between the Republic of Paraguay and the Argentine Territory of Misiones. The primary interest of the book lies in the description of the excellent sport afforded by the game fish "dorado," which in this region approaches, or even rivals, that afforded by the salmon in our northern waters.

There is some truth in the saying that a traveller should recount his experiences of a new country either after three weeks, when the first impressions —never after recaptured—are still vivid; or after thirty years, when he really knows something of the country. The authors naturally fall into the first category and have wisely confined themselves to recording their actual experiences and impressions, with humorous side-lights on the exigencies of living and cruising for three weeks on their small river launch. Numerous illustrations, including some crude but graphic line drawings as well as photographs, add to the interest of a straightforward narrative. A severely practical chapter on the best fishing tackle, etc., for "dorado," presumably the contribution of Mr. Hills, passes on the benefit of our travellers' experiences to those who may dispose of the considerable leisure, as well as spare cash, required to follow

L.

their example. We learn for the first time that a local Dorado Club in Buenos Aires exists to assist the new-comer to this typical South American sport.

The beautiful Iguazu Falls and the Falls of Guayra on the Alto Paraná were visited, for all this district round the great river is a true "waterfall-land." The journey to Guayra is not often undertaken, and an account of the best means of reaching this stupendous cataract to-day is of real value to the English traveller.

A final section deals with a trip to the Paraguayan Chaco, which might well have been omitted. Neither this region nor the authors' experiences are sufficiently interesting or linked with the Alto Paraná portion really to justify its inclusion. As it stands, however, 'The Golden River' conveys a more accurate impression and is better reading than most of the popular literature now appearing on South America. The authors' method of starting the narrative at the spot actually dealt with, without unnecessary descriptions of the ocean voyage or impressions of Buenos Aires, is especially to be commended.

W. S. B.

Geography of the Central Andes: a Handbook to Accompany the La Paz Sheet of the Map of Hispanic America on the Millionth Scale.— Alan G. Ogilvie, M.A., B.Sc. (Oxon.), with an introduction by **Isaiah Bowman.** New York: American Geographical Society. 1922. Pp. xi. and 240. *Maps and Illustrations.*

This volume, which accompanies the La Paz sheet (1/M) issued by the American Geographical Society and noticed at length in the *Geographical Journal* for May 1923, marks a new and important departure in geographical literature. While it has long been asserted in various phrases and definitions that geography takes as its field of study the interrelation of the physical and biological phenomena of a region, regional geographical research has been so little developed that geographical thought tended to be general and unscientific. No doubt the great world generalisations served their purpose, but as these generalisations preceded rather than followed the detailed and intensive investigation of the smaller units, they lost much of their scientific value. "Modern geography requires more than mere description; it demands that genetic (and one might add dynamic) relationships be brought out." This volume is but the first of a series of regional studies of these comparatively small areas, and the hope is expressed that as "the full scheme of activities comes into operation there shall flow a series of truly scientific papers in the field of regional geography," and that these studies will "bring us to a point where a general geographical study of Hispanic America can be made upon a sound scientific basis." The scheme is excellent and may be commended to the compilers of the 1/million sheets of other countries.

A short Part I. is devoted to the maps and surveys upon which the orographical map is based. This has its value, especially to those unacquainted with the actual compilation of such a map, in the evidence of "reliability" which it presents—a matter of great importance in a synthetic study in which the orographical map must play a conspicuous part. The remaining chapters, virtually comprising the whole book, are devoted to a discussion of each important regional factor or component, not as a separate study but as metamorphosed, one might say, in the presence of the other factors making up the regional entity. It constitutes along with the maps in the text a reasoned statement of the knowledge so far attainable of this region, which makes it, together with the bibliography, extremely useful to students. The chief dangers lie in the attempt to take a sheet as the basis of geographical study and the

tendency at times to discuss as "geography" the whole range of scientific study for which data are available in the area under consideration. In this volume these dangers are to a great extent avoided, but there is sufficient evidence that they exist and, with the issue of the other handbooks, care should be taken that they do not degenerate into mere compendiums of information which may be related directly or indirectly to the sheets which they accompany.

W. H. B.

AUSTRALASIA AND PACIFIC ISLANDS

Essays on the Depopulation of Melanesia.— Edited by **W. H. R. Rivers.** Cambridge University Press. 1922. 6*s. net.*

The decline in the population of the islands of the Pacific since they were discovered by Europeans has been constantly remarked upon by voyagers, naturalists, and ethnologists, and has often been regarded as a necessary consequence of the contact of uncivilized peoples with the white man, as a natural disappearance of the savage before the march of civilization. To the humane and sympathetic mind this theory is repugnant. Many of the causes of this gradual decadence have long been known, and that they are largely preventable is a belief that has been forced on the minds of those best qualified to form a judgment on the matter.

In these essays by members of the Melanesian Mission and others the sources of depopulation are clearly stated, and the measures required to overcome them discussed. All the writers speak from personal knowledge of the Melanesian Islands, the Solomons, Santa Cruz, and the New Hebrides. They point out the effects of disease, alcohol, firearms, unrestricted recruitment of labour for the plantations, and the unwise application of European ideas regarding dress, housing, etc. There is however another factor which, until recently, has claimed little attention, but which in the opinion of the distinguished editor is of paramount importance. Dr. Rivers' views are expounded in the last essay entitled "The Psychological Factor." He regards as probably more important and far-reaching than any of the causes to which depopulation is usually attributed the discouragement and destruction of native institutions. "The point I wish to emphasize," he says, "is that through this unintelligent and undiscriminating action towards native institutions, the people are deprived of nearly all that gives interest to their lives. I have now to suggest that this loss of interest forms one of the reasons, if it be not the most potent of all the reasons, to which the native decadence is due. . . . It is the loss of interest in life underlying the more obvious causes which gives them their potency for evil, and allows them to work such ravages upon life and health."

This is apparent on considering the two fundamental causes of depopulation —increase of the death-rate, and decrease of the birth-rate. The former is assisted by loss of interest in life because the native when ill loses heart at once, shows little resistance to disease, and soon succumbs. The latter occurs even when the causes to which depopulation is usually ascribed are absent. The people say, "Why should we bring people into the world only to work for the white man?" "Measures," says Dr. Rivers, "which before the coming of the white man were used chiefly to prevent illegitimacy have become the instruments of racial suicide."

Dr. Rivers' diagnosis of this social disease finds another cause in labour recruitment, even under its most restricted form. By taking the young men, and still more the young women, from their homes where they should be marrying and producing children, it was most detrimental, and moreover tended to spread disease and undermined the work of the missionaries. Further, the

employment to which their recruitment condemned them failed to give them that interest in life which forms the most essential factor in maintaining the health of a people.

This thought-compelling and illuminating essay is another testimony to the loss humanity and anthropology have sustained by the premature death of its author. E. A. P.

The Summer Isles of Eden.— F. Burnett. London: Sifton, Praed & Co. 1923. *Map and Illustrations.* 21*s. net.*

In this book the reader will find a brief account of the Fiji, Tongan, and Samoa Islands as they are to-day, with some information regarding the natives, their mode of life and customs, and also a description of a visit to North Borneo, chiefly spent in Sarawak. Here the author was brought in contact with Dyaks and other native tribes of whom he gives some interesting particulars, and made the most venturesome and original of his expeditions, viz. 200 miles up the Rejang river. A canoe journey on this fine stream through a country of picturesque scenery and luxurious vegetation gave an insight, under the guidance of two officials, Mr. Baring Gould and Mr. Gifford, into the way in which these remote districts with their unruly tribes of Dyaks and Kanyans, at deadly enmity one with another, are administered by a Residential Officer acting single-handed.

The numerous good and interesting illustrations are a feature of the book. They are photographs taken by the author throughout his tour, and show the many phases of native life and the varied scenery and vegetation amidst which it is spent. Many objects of native manufacture, of which the author is evidently an ardent collector, are also illustrated. E. A. P.

POLAR REGIONS

Zum Sechsten Erdteil.— W. Filchner. Pp. 410 and xx. Berlin: Ullstein. 1923. *Illustrations and Maps.*

The second German Antarctic Expedition, which was organized on a more modest scale than that of the *Gauss*, followed in Bruce's track in choosing the Weddell Sea route to the south. The discovery of Coats Land by the *Scotia* had proved the Weddell Sea to be a smaller bight in the Antarctic Continent than had been previously supposed, and it had led to reasonable expectation of the possibility of an accessible land base between lat. 70° and 80° S. Dr. W. Filchner, who was in command of the *Deutschland*, laid his plans well and deserved success. He had shown his ability in survey and sledge travel in his expeditions to Tibet and Spitsbergen, which had most creditable results. The German Antarctic Expedition of 1911–13 was thoroughly scientific in its aims, and even if it failed in some parts of its programme, was far more important than the expedition of the *Gauss*. On the way out useful work was done at St. Paul's Rocks and in the South Atlantic. South Georgia was the base of the expedition, and some surveys were made at the east end of the island. In November 1911 an important cruise was made to the South Sandwich Group, and although sea and weather prevented any landings, much useful work was done. The volume contains striking views and sketches of Lieskov, Candlemas, and Zavadovski islands. On the completion of this cruise the voyage into the Weddell Sea began. The *Deutschland* stood south-east from South Georgia and met the pack approximately in lat. 58° S., long. 33° W., but encountered no real difficulty till lat. 62° S., after which she wisely stood further east and made easy progress south about the meridian of 27° W. New land was discovered extending from about lat. 76° 20′ S. to lat. 78° S. Luitpold Land, or coast

as it should preferably be called, is evidently an extension of Coats Land. It will be recalled that three years later Shackleton discovered the missing stretch in the Caird coast. Filchner found, beyond the Luitpold coast, a remarkable ice barrier, now called the Weddell Barrier, which seems analogous to Ross Barrier. He traced it to the west for some 120 miles, but pack stopped his progress before he found land on that side. Unfortunately, no exploration southward over the barrier surface was possible, and what is even more to be regretted, no journey was made to the several ice-free nunataks observed arising from the land ice of the Luitpold coast, 20 to 30 miles from the sea. Rock specimens of these would have been invaluable in throwing light on the structure of Coats Land. But probably these explorations were reserved for the wintering party, for whom a house was erected on the barrier ice in Vahsel Bay. The house was never occupied, the ice floating out soon after it was completed. The *Deutschland* tarried too long in the far south in an extremely dangerous position, and in retreating was caught in pack and drifted throughout the winter. She was lucky to escape destruction and arrive safely at South Georgia with a long record of valuable oceanographical work. Filchner devotes a great part of his book to the adventures in the far south, but he fails to make a good case for placing the winter hut on the barrier ice, although he admits the imperfections of the site. The book has the merit of being fairly concise, and it is well illustrated with sketch-maps and illustrations, and has a full index. It is a valuable addition to the literature of the Antarctic, and makes considerable contributions to our knowledge of the Weddell Sea. R. N. R. B.

MATHEMATICAL AND PHYSICAL GEOGRAPHY

The Strandflat and Isostasy.— **Fridtjof Nansen.** Pp. viii., 313. *With* 170 *Illustrations and Maps.* Kristiania: J. Dybwad. 1922.

Amid his international philanthropic activities of recent years, Dr. Nansen has found time to complete this long-delayed monograph on a striking feature of the boreal coasts. The Strandflat is a low flat marginal belt, from a few kilometres up to 60 km. in width, in part an integral portion of the mainland at the back of which the mountains often rise abruptly, in part a broad belt of islands and rocks. In reality there are three strandflats—an upper at a level of +30 to 40 metres, best seen in southern Norway; a lower varying from +15 to 18 metres in southern to +8 to 10 metres in northern Norway; and a submerged, chiefly seen in northern Norway, at −10 metres or less. Similar features are described in Spitsbergen, and on many other Arctic coast-lines.

The formation of the strandflat Dr. Nansen believes to be due to subaerial erosion and particularly the action of frost, aided by wave action at sea-level. The several levels, with their local variations, are accounted for mainly by isostatic movements connected with the waxing and waning of the ice-cap, but partly by an actual change of sea-level. In the latter part of the book the author gives a very complete and lucid discussion of the possible results, direct and indirect, of isostatic movements.

While basing his arguments and calculations principally on the supposition of simple hydrostatic displacement of a plastic substratum, he does not overlook the possibilities of compression by overloading and its converse, though he does not explore them far. From his actual observations of the strandflat he draws two conclusions of general interest: (1) that considerable isostatic movements may take place within areas not more than a few hundred kilometres wide, and probably even much smaller; (2) that isostasy is more rapid than many geologists admit, the equilibrium of the Norwegian coast having been re-estab-

lished in a period of between 11,000 and 18,000 years. To these may be added his estimate that sedimentation does tend to produce marine transgression when all allowance is made for compensatory movements.

This work, amply illustrated by maps, photographs, and diagrams, forms an important addition both to descriptive geography and to the study of isostasy.

A. M. D.

Maps and Survey.— **A. R. Hinks, C.B.E., M.A., F.R.S.** 2nd Edit. Cambridge University Press. 1923. 12*s.* 6*d.*

The second edition of 'Maps and Survey' will be warmly welcomed. It is a matter of difficulty to procure a book on a technical subject which not only is ample enough to give a grasp of the salient points, but succeeds in avoiding lapses into unnecessary and exasperating detail: 'Maps and Survey' is such a book, and its appeal is therefore to a wide public.

The first edition was published ten years ago, and in that busy ten years geodesy, survey, and mapping have had their full share of development. The second edition is designed to include these modern developments in special chapters, leaving the matter of the first edition practically untouched; and we are told that a completely new edition may be expected in the future. The new chapters are three in number, and deal with maps, maps and survey in war, and survey respectively. The first of these includes discussions on flying maps and on the Permanent Committee on Geographical Names, brings up to date questions of reproduction generally, and continues the map analysis. Maps and Survey in War is still attractive as a heading, but it is doubtful whether a description of our methods in the 1914-1918 war is of more than historical interest. It depends so much on inventive and cold-blooded people what we shall have to do next time.

The last chapter is most valuable, and before the next edition appears we may expect considerable developments in the automatic and stereoscopic plotting machines with which the author deals therein.

H. S. L. W.

Generalized Linear Perspective treated with Special Reference to Photographic Land Surveying and Military Reconnaissance.— **J. W. Gordon.** 8vo, pp. vi. + 184. London: Constable & Co., Ltd. 1922. *Price* 21*s.*

Just at the end of the war a committee appointed to investigate Mr. Gordon's proposals for survey from air photographs reported that they did not constitute a reasonable method of mapping, nor indicate a promising line of development. But Mr. Gordon has not been deterred by this adverse finding, and he returns to the subject in a book which is very difficult to review. The author considers that the development of air survey is hampered by a want of a "generalized theory of linear perspective" which this book tries to supply. Unfortunately Mr. Gordon's terminology is confusing and his mathematical language defective; and though we hesitate to say that there are no new and valuable ideas in the book, they are—new or old—obscured by the method of presentation, so that the labour of understanding the book is disproportionately great. The terminology is bad: we have three sets of lines in one theorem called respectively horizontal, aplanatic, and planetary. The geometry is vague: the horizon is sometimes a line, sometimes a plane, and once a term in a geometrical progression. Common words like reciprocal do not seem to have their usual meaning. A reference plane is intersected by an optical axis in a "prime parallel." Two planes are "conceived to be coplanar, and connected together by means of their cardinal lines"; and so on. As a treatise on perspective the book is obscure: and it does not profess to

describe any practical methods of survey. There is some curious talk of projecting vertical floating beacons on to the photographs, and so getting rid of "planted" beacons altogether. "The military reader will, no doubt, be content to judge for himself whether it will better suit him to project a floating beacon or to deposit a fixed one in enemy territory when he is making a reconnaissance." These practical considerations are left quite undeveloped, and the "beaconed plumb-line" remains a mysterious suggestion.

In an appendix Mr. Gordon discusses six overlapping photographs taken on the line Westerham–Godstone supplied by the Air Ministry. By comparison with the O.S. 25-inch map he derives certain constants for each, and draws perspective diagrams, but makes no attempt to combine the material into a map for comparison with the original. We are left therefore very uncertain of the process or of the results, and can only regret that the author has not been able to make his meaning clearer to the average understanding.

A. R. H.

THE MONTHLY RECORD

EUROPE

The Etesian Winds of the Eastern Mediterranean.

THE persistent strong northerly winds which blow over the eastern Mediterranean during the later summer months were of much concern to the ancient Greeks, and even to this day remain a considerable source of danger to navigation. They are discussed in detail by J. S. Paraskévopoulos, of the National Observatory, Athens, in the *Monthly Weather Review* for August 1922. The Etesians are divided into two classes: the preliminary *prodroms*, which blow in the early summer about the second half of May and are neither very regular nor very strong, and the true *etesians* which, after a break usually occurring in June when the winds are variable, become established fully in July, and gradually die out towards the end of September. The Etesians blow over a wide area, but are more reliable and persistent over the Ægean Sea than over Greece; and whereas in the Ionian Sea the direction is rather west of north, in the Ægean it is east of north. As a rule the strength of the wind, which not infrequently reaches 50 miles an hour by day, drops light at night in consequence of a diminution in the steepness of the controlling barometric gradient as the land surface of Asia Minor cools down. The Etesians are fundamentally caused by the summer low pressure near the Persian Gulf, and are thus dependent on the same cyclonic centre which regulates the south-west monsoon. Their comparatively low humidity, high temperature, and high speed occasion excessive evaporation, so that they exert a fairly refreshing physiological influence, particularly at sea; but their stormy force and the clouds of dust raised make them unpleasant and dangerous to shipping, particularly on the southern coasts of certain islands where the wind breaks through gaps in the mountains. This association of winds of storm force with the fine sunny weather of the summer Mediterranean climate seems incongruous to those accustomed to the Atlantic gales of north-western Europe.

The writer shows clearly that, except in the fully developed phase, it is often very difficult to distinguish the "Etesians" from the ordinary north winds of the Ægean in summer, and to say precisely when they commence or cease.

Changes in the Mouth of the Isonzo.

A careful study of the changes which have taken place in the lower course and delta of the Isonzo—the river entering the Adriatic at its head which was the former boundary between Italy and Austria—within historical times, has been made by Signor Ardito Desio in the *Rivista Geografica Italiana*, Ottobre–Dicembre 1922. Like other torrential streams descending from the Alps to the Adriatic, which are liable to sudden floods, the Isonzo has many times changed its direction in various parts of its course, and the nature of these changes has long been debated. In the absence of all mention of the Isonzo (*Sontius*) by authors before Cassiodorus (468–562 A.D.) some writers have postulated an underground course for the river from a point below Gorizia to the Lake of Dobendo, after which they suppose it to have entered the sea by the present Timavo, mentioned by the earlier writers as one of the rivers of this region, though at present its course above ground is of the shortest. The subsequent change would in their opinion be due to the blocking of the supposed underground passage. Others have rejected this explanation and held, like Gregorutti, that the general hydrography has changed but little since preglacial times, but that the river spoken of by the classical writers as the *Timavus* was really the Isonzo of those days, though the *Fons Timavi* was the existing source of the Timavo. Gregorutti believed that the river then entered a long narrow lagoon (formed by the detritus brought down by itself) by the nine (afterwards seven) mouths spoken of by the old writers, the whole drainage entering the sea by the one channel now known as the Foce di Primero. In general Signor Desio agrees with this view, but shows that the changes since the sixteenth century can be traced with some precision by a study of the maps which have come down to us. Broadly speaking, there has been a progressive shifting of the mouth from south-west to north-east. It was towards the end of the sixteenth century that the lower Isonzo, which then occupied the channel of the present Isoncello or Isonzato, appears to have first sent a branch to the Sdobba, which later became the main mouth; its rate of advance into the sea can be calculated by a comparison of various maps. The process has been continued in our own day by the opening of the channel of the Quarantia, north of the Sdobba mouth, which was only completed in 1918. This in turn has already begun to push the deltaic material out into the sea. The constant shifting of the mouth to the left rather than to the right may perhaps be due to the amount of detritus brought down by the many rivers to the west of the Isonzo, which would block the way in this direction.

ASIA

Kozloff's New Expedition to Central Asia.

Our Gold Medallist, Colonel P. Kozloff, informs us that he is about to start on a new exploring expedition to Mongolia and Tibet organized by the Russian Geographical Society, this being the sixth in which he will have taken part, and the third under his leadership. It is planned to last three years, and will consist of twenty-one persons. During the present year the expedition will proceed to Kiakhta, and then make its way through Mongolia *viâ* Urga and Khara Khoto to the Middle Nan Shan and Tsaidam. It will spend 1924 in Tibet, exploring the elevated region about the sources of the Yangtse, Mekong, Salween, and other rivers, and carrying out researches in geology, botany, zoology, and ethnography. It is impossible to say at present what further work will be undertaken, *e.g.* whether it will extend to southern and eastern Tibet, which, with their comparatively rich vegetation and animal-life, offer an

attractive field for study; nor can it be said whether it will return through China, Mongolia, or Eastern Turkestan. We wish the persevering explorer all success in his new enterprise.

The New Volcanic Islands in the China Sea.

Through the courtesy of the Hydrographer we have been favoured with an extract from the report of H.M. Surveying ship *Iroquois*, which visited the scene of the eruption in the China Sea early in May, as noted in the July number of the *Journal*, p. 37. The larger of the two islands is described as about 500 feet long in the direction 90° and 270°, by about 200 feet wide, with a height of about 97 feet. It stood on a low ledge projecting about 200 feet into the water on all except its southern side, which was steep to. No signs of activity were observed on the occasion of the visit of the *Iroquois* on May 8, nor were gases or steam seen. Depths of over 50 fathoms were found within a distance of half a mile round the island. The second islet was then about 100 feet long and 1½ feet high, but there was a considerable area of turbulent water in the vicinity, and several minor eruptions were observed, mud, etc., being thrown up to a height of about 40 feet from a crater a little to the west of the drying portion. At the eastern end there was a patch of metallic blue water, supposed to be due to escaping gases. No smoke or vapour was observed over this island, but sulphur fumes could be detected 3 miles to leeward, by which the ship's paint was greatly discoloured. Photographs taken by Lieut. G. A. R. Leslie of the *Iroquois* on May 8, which have been kindly lent us by the Hydrographer, show the larger island as seen from three different directions at distances varying from ⅓ to ¾ mile. It appears as a solid mass standing well out of the water, flat topped over the greater part of its area, but falling fairly steeply all round, especially on the north and west sides, where the lower part of the visible slope appears almost perpendicular.

AFRICA

Hassanein Bey's Journey across the Libyan Desert.

A few more details about this important achievement (*Journal*, July number, p. 54) were telegraphed by the explorer after his arrival at El Fasher, the capital of Darfur, in the latter part of June. From Sollum he went first to Siwa and thence to Jaghbub (Jarabub), the Senussi headquarters, where he was delayed thirty-four days by the scarcity of camels and the fear excited by the fanatical Zuwiyas. When at last able to proceed he took the road to Jalo, which he reached after eleven days of sandstorms, varied by moonlight nights. Making up his party at Jalo he went south to Kufara, reaching Bir Zieghen after nine days across the bare expanse of sand, and Hawari, on the northern outskirts of the oasis, after four days more across an area of sand-dunes. Kufara was reached on April 1, and after a fortnight spent in preparation, Hassanein Bey started to cross the unexplored desert to the south by an unfrequented route, choosing this in preference to the trade route to Wadai. The Erdi hills were reached on May 15 after a nineteen days' march, the route passing the hitherto uncharted oases of Arkenu and Owenat. South of these the bare sand gives place to country covered more and more thickly with grass, becoming at first undulating and then broken. At Erdiba inhabited country was entered, and the further route led through the country of the Goraan and Bidean tribes, water being found on the average every fourth day. In spite of the suspicions of the desert people, the traveller was able to take theodolite observations and carry out a compass-traverse of his route. On June 29 he started on the return to Egypt by way of El Obeid and Khartum.

AMERICA

The Lassen Peak Volcanic Eruption of 1914–15.

An interesting address by Dr. Arthur L. Day, on the possible causes of the great outbreak of Lassen Peak, California, in 1914–15, was delivered before the Commonwealth Club of San Francisco a year ago, and has since been printed in the *Journal of the Franklin Institute* (vol. **194**, No. 5, 1922). The speaker described the succession of occurrences during the course of the outbreak, so far as it had been possible to ascertain them by careful inquiry. Lassen Peak, with its height of 10,466 feet, possessed an old crater-bowl, oval in shape, from 1000 to 1200 feet in diameter, and about 350 feet in maximum depth, rarely free from snow at any season. The first explosion, on 30 May 1914, was of no great violence, but resulted in the formation of a small explosion vent in the crater, with cracks extending about 100 feet in an east and west direction. To the importance of these cracks Dr. Day thinks that sufficient attention has not been given. A succession of subsequent explosions showed a gradual increase in duration and intensity, the explosion vent being enlarged till it included nearly all of the old crater bowl. The activity culminated, on the night of 19 May 1915, in a terrific outbreak in which red-hot, but solid, material was thrust up from below, while a great mud-flow on the north-east devastated the valleys of Hat Creek and Lost Creek for some 20 miles, being due to the sudden melting of the winter accumulation of snow and ice. But the greatest effect was produced by a horizontal blast from the crater, which completely devastated the primæval forest in Lost Creek valley for a distance of $4\frac{1}{2}$ miles. Had a city stood in the track of the blast the loss of life might have been as complete as in the great Pelée eruption of 1902. The whole series culminated in a still greater outbreak on May 22, also accompanied by a horizontal blast bursting from the same opening. The chief *raison d'être* of the paper is the attempt to explain the cause and precise mechanism of the outbreak, and particularly its character as a series of ever-increasing explosions in place of a single catastrophe. Stress is laid on the comparatively low temperatures at which the phenomena occurred, the abundant water-supply, and the high silica content of the magma, which enables it to carry in solution 10 or 15 per cent. of water when in liquid condition under pressure. When the temperature falls sufficiently to permit crystallization all the water above 1 or 2 per cent. is set free, generating an enormous pressure within a closed chamber, which will be burst through at the point of greatest weakness. This has been proved experimentally in the laboratory. The writer therefore supposes the successive explosions to have been due to the admission to the volcano hearth of quantities of water which constantly increased as the crater floor became more and more shattered, "bringing an increasing quantity of crystallizing magma into an action which eventually becomes more or less self-perpetuating until all the available uncrystallized magma is participating. Then follows the culmination and subsidence." Now if the resistance of the envelope had been overcome solely by accumulated pressure within, a single terrific explosion might have been expected. Dr. Day therefore thinks that the resistance must have been weakened in the first instance by action from without, such as an earthquake crack (this structural weakness being extended gradually by subsequent explosions), and it is for this reason that he lays stress on the cracks discovered shortly after the first explosion.

GENERAL

New Light on an Early Eastern Traveller.

As one of the comparatively few European travellers who made their way to the East before the opening of the sea-route round the Cape, the adventures of the Genoese merchant Geronimo di Santo Stefano have attracted some attention, though the only account of them extant is contained in a letter written by him from Tripoli in Syria to a compatriot and relative in Beirut on his return from the Indies. That even this has come down to us is due to its having fallen into the hands of the well-known printer Valentim Fernandes, who included it in his collection of early Italian voyages to India, brought out in 1502 under the title 'Marco Paulo.' This version of the letter was in Portuguese, but an Italian translation was included by Ramusio in his famous collection, and an English translation by Mr. R. H. Major was given in the volume entitled 'India in the Fifteenth Century,' published by the Hakluyt Society in 1857. In 1901 both the Portuguese and Italian versions were reprinted by the Italian writer Prospero Peragallo, with the addition of notes and observations elucidating obscure points in the story. Peragallo pointed out that the friend to whom the letter was addressed, called Mayer in the Portuguese, Mainer in the Italian, must have been a member of the noted family of the Maineri in Genoa ; and that as there were many Genoese merchants settled at Lisbon at that time, a copy of the letter might naturally have been sent there and so fallen into the hands of Fernandes. The journey must have been begun quite early in 1494, since, after many adventures, the traveller's companion Adorno died in Pegu in 1496. Santo Stefano must have returned to Genoa, since he is spoken of in 1502 as a person of importance there, and recommended to Columbus, who gave a favourable reply, and who seems to have brought him forward at the Spanish Court, judging from various references to a "Gerolamo" in the Admiral's letters from 1503 on. These conclusions have now received confirmation from a document discovered in the Genoa Archives by Signor Ambrosio Pesce, who prints it, with interesting notes on the families of S. Stefano and Maineri, in the *Bollettino* of the Italian Geographical Society, 1922, Num. 7–8. The document refers to a lawsuit arising out of the will of Susanna, daughter of Antonio Maineri and wife of Benedict di S. Stefano, of whom our Geronimo was the son. When the will was made, apparently in 1498, the traveller was still in foreign parts ("in partibus valde remotis"), and the disposition of certain property depended on his return within five years. The lawsuit took place in 1512, and the document shows that Geronimo *had* returned within the five years, but had very soon gone abroad again ("ad longinquas partes"). The will refers to a brother Antonio as having also gone abroad, and having been lost to sight for some years, so that he was probably dead, and the document of 1512 shows that nothing had been heard of him till then. It is an interesting speculation whether in Antonio we have another adventurous voyager, hitherto unknown to fame. From the records relating to the Maineri family it appears that the correspondent of Geronimo was great-grandson of Antonio Maineri (father of Susanna above mentioned), being grandson of her brother Gerolamo.

A Pair of Globes by Isaac Habrecht of Strassburg, 1625.

We have received from Dr. K. Isoz of Budapest a brief description, with photographs, of a pair of globes made by Isaac Habrecht of Strassburg in 1625, which do not appear to be yet known to students. According to a note written by Dr. Wodetsky, of the University of Budapest, the globes have a diameter of

about 8 inches, and each is fixed by its axis to a graduated metal meridian circle working in a wooden horizon supported by four turned pillars. Each is covered by twelve finely engraved gores. The celestial globe (which bears the date 1625) is stated to be produced "sculptura et impressione Jacobi ab Heyden; Joh. Christoph. Weigel exc. Norbergi"; another inscription giving the authorship: "Studio et opera Isaaci Habrecht, Phil. et Med. Doc." The printer's and author's names are also given on the terrestrial globe, which in the dedication speaks of the issue of a set of *three* globes, the celestial being both in convex and concave form, but of these the latter is lost. From the few details of the geographical representation supplied, this terrestrial globe appears to agree generally with the globes and maps of the Dutch cartographers of the period, on which it is but natural to suppose it would be based to some extent. The prime meridian passes through San Miguel in the Azores, and the meridians and parallels are drawn at 10° intervals. The usual "Terra Australis" is shown round the South Pole, and a part of New Guinea is marked with the legend "Nova Guinea, sic dicta quod eius littora faciei Guineæ Africanæ multum sint similia. Dicitur a nonnullis Terra de Piccinacoli, et sitne insula an pars continentalis Australis incertum est." The merits as discoverers of John Davis in the north and William Schouten in the south are dwelt upon, and in the north, besides the "Fretum Davis," the discoveries of Hudson are shown. In his well-known book on globes, published at Leipzig in 1895, Fiorini mentions both I. Habrecht the elder, assistant to Dasypodius, and a son of the same name who wrote a treatise on the globes at Strassburg in 1628, but he knew of no globes made by him. According to Poggendorf's biographical dictionary he died in 1633. We understand that the pair of globes is for sale at the high price of £550.

OBITUARY

Count F. de Montessus de Ballore.

M. DE MONTESSUS DE BALLORE, who died recently at Santiago (Chile), was our principal authority on the geographical distribution of earthquakes. He was born in France in 1851, passed through the École Polytechnique in company with Marshal Foch, and at the age of thirty was appointed chief of a military mission to the republic of San Salvador. Keen and enthusiastic in all that he undertook, he made a detailed study of the earthquakes of Central America. Returning to France, he extended his inquiries to the earthquakes of the whole world. The compilation of his catalogue of nearly 160,000 earthquakes was the work of nearly a quarter of a century. The complete catalogue was of course too large for publication, but from time to time memoirs dealing with special seismic districts were issued, most of them written in French, but others in English, Dutch, Italian, Spanish, and even Russian. The results of his wide survey were summarized and described in his important work 'Géographie Séismique' in 1906. In this he stated the law that the most unstable regions of the globe are those of greatest surface-gradient; and he also showed that more than nine-tenths of all known earthquakes originated along or near two great circles of the Earth, one passing through Italy, the Balkan peninsula and the Himalayas, the other traversing the margins of the Pacific. In the following year he published another large and important work, 'La Science Séismologique,' and afterwards proceeded to Santiago as head

of the geodynamic service of Chile. The organization that he created there was so effective and his studies of the Chilean earthquakes so valuable, that we cannot but regret that we shall not have from his hand the full report that we were expecting on the great earthquake of November 11 last. C. D.

Edward W. D. Holway.

Prof. E. W. D. Holway, whose death occurred on March 31 last, in his seventy-first year, had been a Fellow of the Society since 1910. Although his career was not actively concerned with geography, he was in full sympathy with the subject, and his botanical researches and collections had taken him into many out-of-the-way places. Born in 1853 in Adrian, Michigan, his early life was spent mainly in Decorah, Iowa, where he engaged in banking. He assembled a valuable botanical library, which, upon his appointment as Assistant Professor of Botany at the University of Minnesota in 1904, was incorporated in the University library.

He was an international authority on the *Uredineæ*, which he collected in Mexico, Central America, Brazil, Chile, Peru, Bolivia, Ecuador, and Canada, publishing the results in a series of monographs. In a number of these countries no collections of rusts had ever been made, so that many of his specimens were new to science, and were named in his honour, as were also various species of flowering plants. He also travelled in the western United States, Europe, and the West Indies. Wherever he went he left the beaten paths, often depending solely upon the simple necessities that he could carry with him. He was a remarkable pedestrian as well as a skilful and enthusiastic alpinist, exploring and climbing in the remoter portions of the Canadian Rockies and of the Selkirks of British Columbia, where a peak bears his name with official sanction. Many pioneer ascents lie to his credit in these ranges. In 1916 he led the first mountaineering expedition into the unknown Cariboo range.

He was a man of wide interests and of a most kindly nature, belonging to the class of naturalist travellers who contribute to geographical knowledge by the extent of their wanderings in pursuit of their particular object of study.

H. P.

Clement Lindley Wragge.

We regret to record the death, on 10 December 1922, of Mr. Clement L. Wragge, a Fellow of this Society since 1875, and well known as a keen meteorologist, who did much to forward the cause of meteorology, especially in Australia. Born at Stourbridge in 1852, and educated at Uttoxeter Grammar School, he forsook the career of a solicitor for which he had been intended, and obtained a post in the Surveyor-General's department at Adelaide in 1876. Besides establishing various meteorological observatories both in Great Britain and the southern hemisphere, including the high-level stations on Ben Nevis (which he worked for some years), on Mt. Lofty, South Australia, on Mt. Wellington, Tasmania, and on Mt. Koschiusko, New South Wales, he was responsible for the inauguration of the Australasian Weather Bureau at Brisbane in 1887, and nearly twenty years later for the reorganization of the Meteorological Service of Tasmania. He also travelled widely, and was author of a book on the Pacific Islands, published in 1903 under the title 'The Romance of the South Seas.' In spite of his activities in Australasia he long maintained a connection with his early home, and presented to the town of Stafford the collections now known as the Wragge Museum. His latter years were spent

in New Zealand, where he settled in 1910, and his death occurred at Birkenhead in the province of Auckland in that Dominion.

I. N. Dracopoli.

In reference to our notice of the late Mr. Dracopoli in the March number (p. 231) we are asked to correct the statement that he came of Greek parentage, his father belonging to an old and well-known *Italian* family. Although his mother was British, his father retained his Italian nationality throughout, but the son became a British subject in 1914 in order to serve in the British army.

CORRESPONDENCE

Lotus-Land Japan.

IN a review of a revised edition of my book 'In Lotus-Land: Japan,' in the *Journal* for June, the writer states that he finds "many mistakes in the spelling and use of Japanese names, and in the diacritical marks which have so important a bearing on both their pronunciation and meaning."

Japanese is written in Japanese characters, and I spelt all names and words as phonetically as I could in English. In a most complimentary review of my book (a copy of which I send you) which the famous Japanese artist-author, Mr. Yoshio Markino, wrote in the *Bookman*, he stated: "My idea is that Japan has her own alphabet and spelling, and all the original words ought to be written in our way, and if any European wants to write Japanese words in his own alphabet and spelling, let him do it in his own way. And Mr. Ponting has done so. For instance, the Japanese Roman spelling law would spell 'kaya,' which he spells 'kaia,' and 'semi' which he spells 'seimi.' And how faithful he was to spell 'Chion-ji' as 'Chio-ji'! That is just how Kyoto people would pronounce!" Mr. Markino also stated: "The text is as truthful and sympathetic as the pictures. I sincerely recommend this book to every one who has a desire to visit Japan."

Your reviewer disputes the accuracy of my statement about the small seedless grapes which grow on the lower slopes of the volcano Asama-yama, stating that they are bilberries. My notebook shows that the mountain porters, who accompanied me on my ascent of the volcano, informed me that the fruit was known to them by the name "yama budo," which translated means "mountain grape." The Japanese call the bilberry "hama nashi" and "fujimmi." I am scarcely likely to be mistaken, as I owned a vineyard in California for six years in my younger days.

As regards the distances from the summit of Mount Fuji to Otome-toge, and to Lake Yamanaka, which your reviewer states are "greatly exaggerated." In the former instance the expression used was, "The pass is 3,333 feet high, and between it and Fuji there are 20 miles of space." The latter instance the expression used by me when in describing the exquisite spectacle of the lakes as seen from the summit of Fuji was "Yamanaka, nearest of them all, 2 miles below us and 15 miles away as an arrow speeds its flight, mirrors the azure heavens," etc. Reference to the map in Murray's guidebook shows that, allowing for the difference in height of about 2 miles, in the former instance the distance is 17 miles, and in the latter, to the end of the lake, 13 miles. The picturesque expressions used were, therefore, 3 miles out in one case and

2 miles in the other. Surely any one inspired by the feelings of an artist, writing of the scenic aspects of Japan, would be justified in speaking thus broadly. (The distance by footpath is in each case very much more.)

Your reviewer states, "The attractive feminine subjects depicted are almost all of a special class, and do not represent the ordinary type of Japanese women." As this sentence is likely to be widely misunderstood, I wish to state that some of the feminine subjects illustrated in my book are geisha. The social status of the geisha I have described in my book, and I have tried to remove some of the misconceptions about her. To most people the geisha is the most interesting feature of the feminine life of Japan, as she is certainly also the most picturesque, and the geisha has been famous throughout Japanese history.

The other feminine subjects depicted in my book include several studies of the pretty daughter of a Tokyo merchant; several studies of the pretty proprietress of a prosperous curio business at Miyanoshita; several studies of the dainty little waitresses of the famous Fujiya hotel at Miyanoshita; the daughter of a Kumamoto banker; the wife of a wealthy Kyoto manufacturer; a lady and her daughter travelling in the mountains; a proprietress; a ceramic artist; lady visitors to temples, etc.; country women and peasants. If such people do not represent "the ordinary type of Japanese women," I should like to know what they *do* represent.

Such a phrase as your reviewer uses is more open to misconstruction about the women of *Japan* than it would be about the women of *any* other land. Applied to the women of England or America it would mean nothing in any way suggestive; but it is quite different when applied to the women of Japan. There is "a special class" of women in Japan of whom every one has heard. They, and their environment, were favourite art motives of some of the old-time masters. The locality where they reside is one of the sights of Tokyo, and every visitor goes to see it. It therefore behoves one so punctilious about accuracy in trifling things in others, to weigh more carefully his own words about really serious matters.

As many of the "attractive feminine subjects" depicted in my book are friends whom I hold in esteem, I must request that you publish this letter with as much prominence as you gave to the review of my book, in the hope that it may serve to remove all possibility of misunderstanding about those whose photographs contributed so largely to make the book attractive.

H. G. PONTING.

[We have referred the above letter to the reviewer, who replies as follows:]

I much regret to learn that Mr. Ponting resents certain criticisms in my review of his book 'Lotus-Land Japan' in the June number of the *Journal*. May I be permitted to reply to some of the objections raised in his letter?

In doing so I must again draw attention to his statement in the Foreword that the volume "is intended, primarily, as a guide-book for the traveller." Apart from the fact that, in spite of its avowed purpose, it contains no map, this claim lays it open to closer criticism, and presupposes a greater degree of accuracy on points of detail than is expected in the ordinary travel-book.

With regard to the specific points raised in Mr. Ponting's protest I should like to make the following observations, at the same time remarking that they are based on many years of residence in Japan and on close study of things Japanese both at home and abroad.

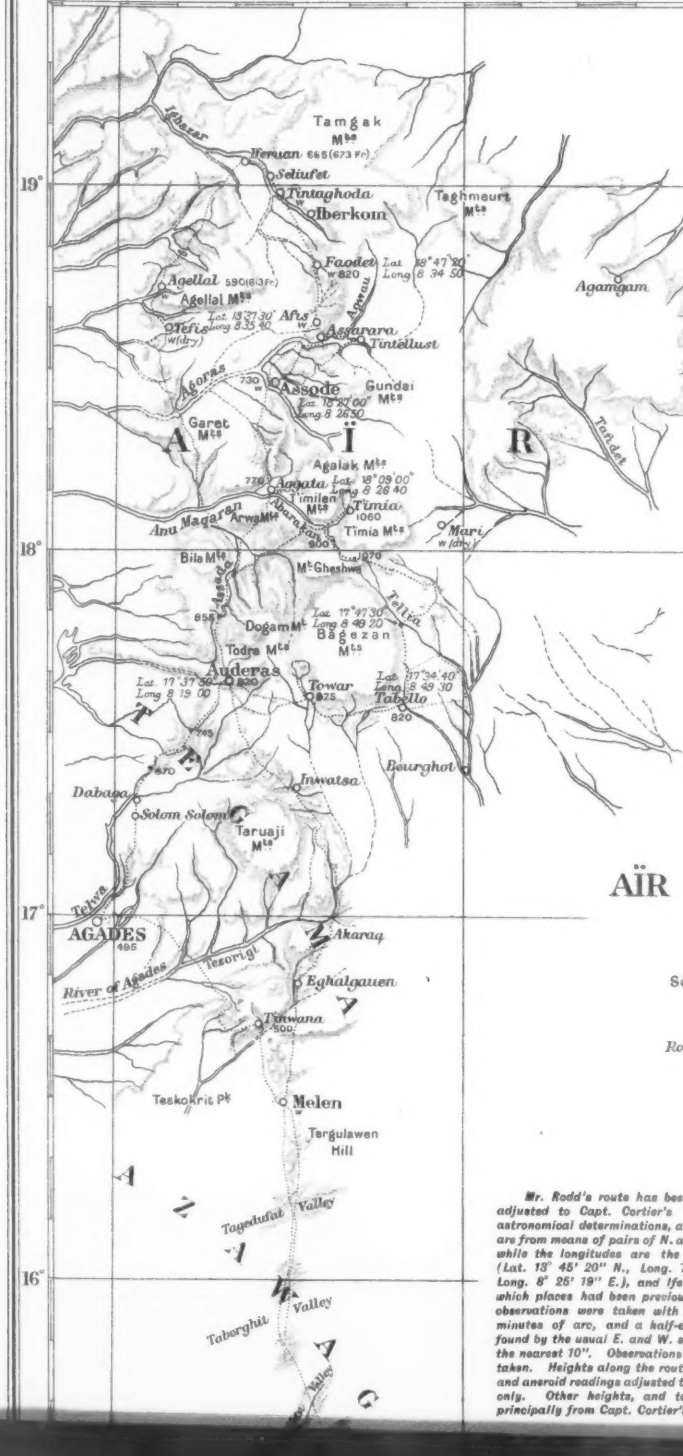
The wild berry one finds growing profusely on the lower slopes of Asama-yama, from which the excellent jam is made in and about Karuisawa, and with

which I have been pleasantly familiar for a quarter of a century, is known locally, it is true, as *Asama-budō* (Asama grape), *budō* being often used by country people to indicate a small round fruit bearing some resemblance to a grape. In this case it is a bilberry, and on one occasion the enterprising jam-maker of the village presented me with a dozen tins with a view to propaganda on his behalf!

Touching my criticism as to the mis-spelling of many Japanese words, the misuse of diacritical marks, etc., Mr. Ponting states that he has "spelt all names and words as phonetically as I could in English." On this point I would ask Mr. Ponting to compare his own usage with that adopted by practically all the leading English writers on Japanese subjects, whose authority not even he, I think, would wish to impugn. I will, however, confine myself to naming one whom both he and I would accept as an ultimate arbiter in this matter, our mutual friend Mr. Basil Hall Chamberlain, formerly Professor of Japanese and Philology in the Imperial University of Tōkyo, and editor of that unique 'Murray's Handbook for Japan,' of which Mr. Ponting writes (p. 1) as the "best of all guide-books on any land. . . . I know much of it almost by heart." Not only does Mr. Ponting, in many scores of instances, by his practice, oppose this authority, but by mis-spelling some words and by misplacing, in numerous cases, the diacritical marks now almost universally adopted by these scholars, he does really quite alter the proper pronunciation, and often the actual meaning, of a large number of place-names.

Exception is taken to my criticism that the distances from the summit of Fuji to the top of the Otome-tōge and to the nearer shore of Lake Yamanaka, respectively, are exaggerated. Mr. Ponting's figurative expressions are intended to convey the idea of a "bee-line"—the shortest distance between the points named. Careful measurements on several authoritative maps show that in the former case the distance is close on 15, and in the latter 8, miles—figures which the reviewer's intimate acquaintance with Fuji at all seasons and from every side permits him to confirm from personal knowledge.

The most serious remonstrance, however, is reserved for the reviewer's remark on one aspect of some of the beautiful photographs which put Mr. Ponting's book in a special category. In commenting on the offending criticism Mr. Ponting assumes that the words "a special class" can have only one meaning, and that of the most injurious character. The words in question were not intended to convey any such reflection. They were employed as an antithesis to "ordinary type," and simply indicated that the charming young people photographed were to a large extent specially chosen, as hotel waitresses, etc., for their attractive appearance and intelligence. A number of them, as well as the gracious lady who has trained them and scores like them, were known personally and individually to your reviewer and his wife during many visits to the best hotel in the Far East, extending over a number of years. Nothing was further from the writer's mind than to suggest any such offensive imputation as Mr. Ponting has attributed to the expression.



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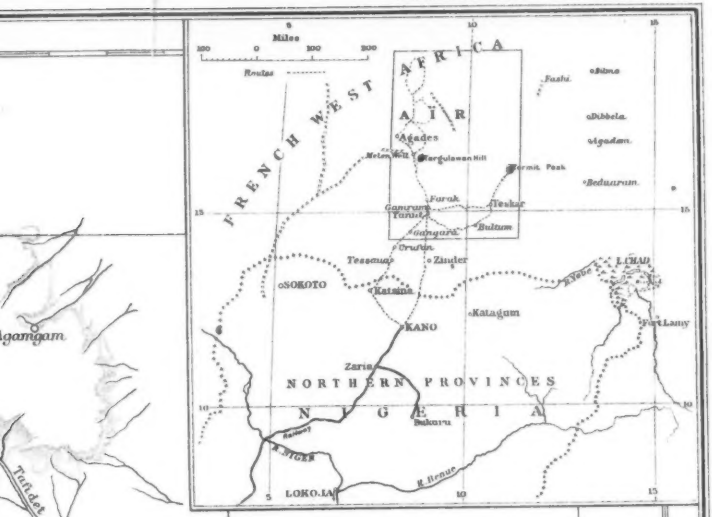

Map showing
Mr. FRANCIS RODD'S ROUTES
in
AÏR AND ADJACENT PARTS
of
FRENCH WEST AFRICA.

Scale 1:2,000,000 or 1 Inch = 31·6 Stat. Miles.

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Routes..... *w Wells.* *Heights in metres. (Approx.)*

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17°

16°

Termit Mts

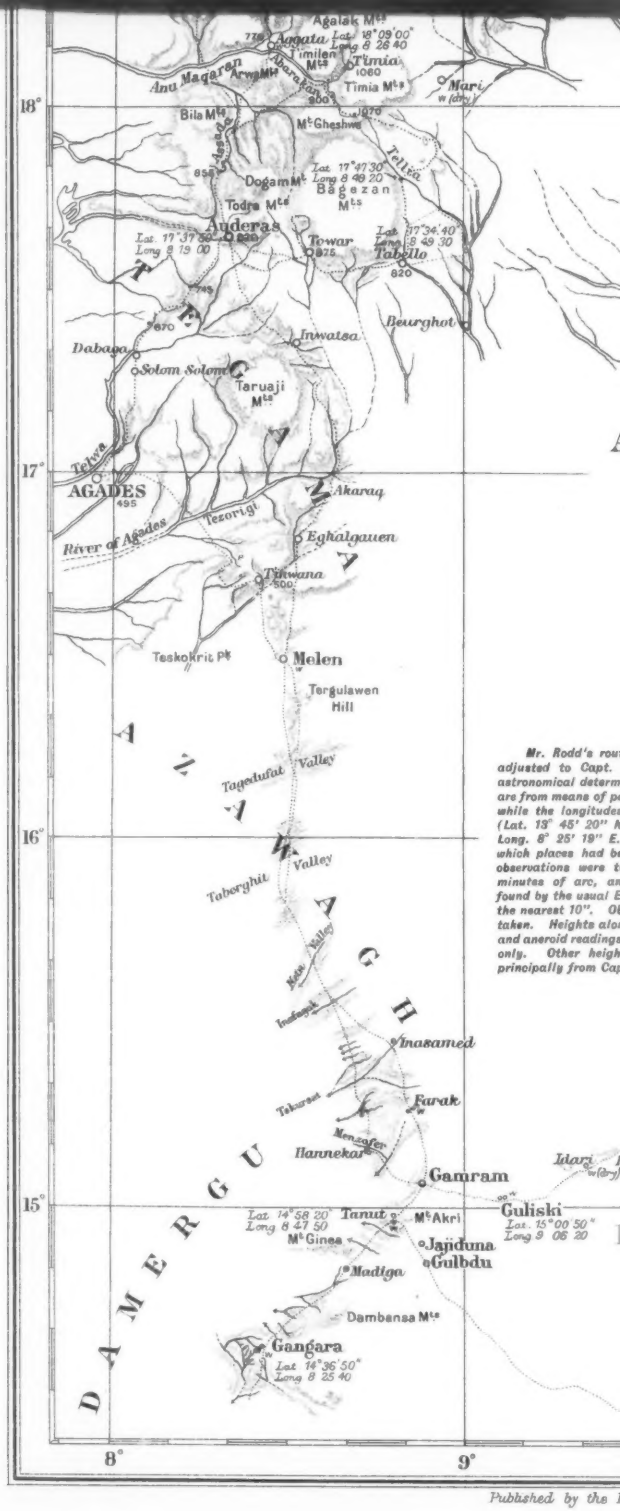
Lat. 16°04'10" N.
Long. 11°04'50" E.

Termit Pk

D e s e r t

NOTE.

d's route has been plotted from his prismatic compass traverse, Capt. Cortier's "Carte de l'Air," 1/500,000, and to his own determinations, at the points indicated on the map. The latitudes ns of pairs of N. and S. star circummeridian altitudes, and Polaris, ngitudes are the result of chronometric differences from Tesawa 3' 20" N., Long. 7° 59' 12" E.), T'inwana (Lat. 16° 42' 32" N., ' 19" E.), and Iferuan (Lat. 18° 04' 28" N., Long. 8° 22' 22" E.), had been previously fixed by French officers. The astronomical were taken with a 3-inch vernier theodolite, reading to single arc, and a half-chronometer watch, the local mean time being usual E. and W. star method. The positions (means) are given to 0". Observations for azimuth and variation of compass were also ghts along the route are from Mr. Rodd's boiling-point observations readings adjusted to them. They must be considered as approximate r heights, and topographical details away from the route, are from Capt. Cortier's map.



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Long 11 04 50 W
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Termit Pk

D e s e r t

Sand dunes

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Talhras
Tigefen
Idari
Ighelas
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E L A K K O S
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Dium
Kanakaju
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18°
17°
16°
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lished by the Royal Geographical Society

AÏR AND ADJACENT PARTS.
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